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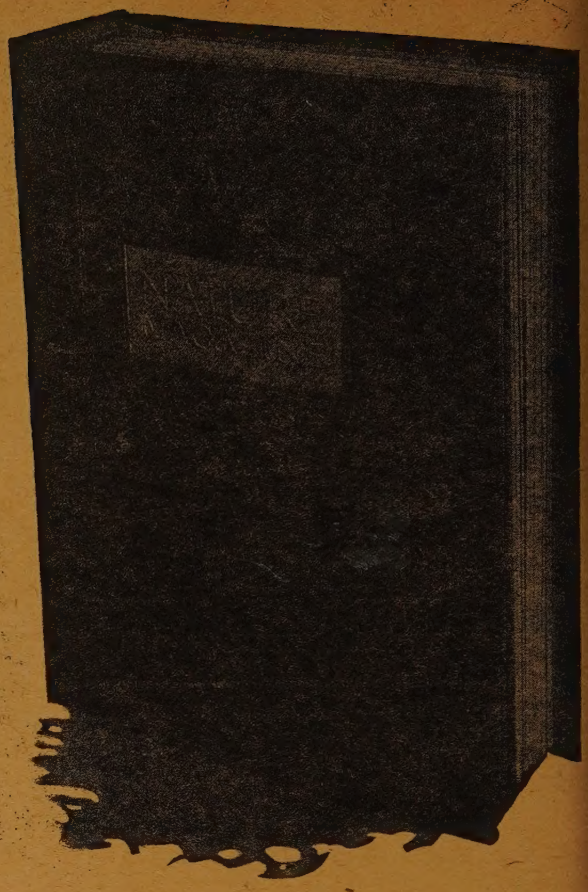

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Wildlife Conference

"Wildlife Wealth, If We Want It" is the theme that has been selected for the sessions of the Thirteenth North American Wildlife Conference, which will be held in St. Louis next March 8 to 10, with headquarters at the Jefferson Hotel. The meeting will be held under the sponsorship of the Wildlife Management Institute. A broad program is outlined for both the general and technical sessions, which annually bring together the largest single gathering of conservationists, specialists and interested laymen.

More on Robins in White

Some readers have wondered what further developments there have been with respect to the albino robins described by H. Roy Ivor in our March, 1947, issue, and taken by him to his aviary for observation. It was hoped that something might be learned about the maintenance of an albino strain, but there has been no luck so far. Cherrilee, the male, mated with Weewee, and Papeek, the other male, mated with a normally colored female robin. When the first two were moved to the breeding aviary they felt strange and did not attempt to build a nest. Papeek's mate built a nest and laid four eggs, which were pillaged, possibly by a chipmunk. This happened a second time, and no eggs were laid in a third nest that was built. All three albinos were more vicious among themselves and with other birds than any normally colored robin that had been kept for study. They are, however, in excellent health, and during the molt no tinge of color appeared. Better luck is hoped for in the future as the albino temperaments are better understood.

Colonel White Retires

Dean of National Park superintendents, Colonel John R. White, has retired from his post as superintendent of Sequoia and Kings Canyon National Parks in California. After a colorful career, which included service in the Foreign Legion as a young man, command of the Philippine Constabulary and service in World War I, Colonel White entered the Park Service as a ranger in 1919, soon became a superintendent and, in twenty-seven years, has made signal contributions to the success of the park movement. He will be missed, but is entitled to a rest.

Ornithology Notebook

Ornithology Laboratory Notebook. By Arthur A. Allen. Ithaca, New York. 1947. Comstock Publishing Company. 256 pages. Illustrated. $4.00.

This is the fifth edition of this valuable notebook for recording observations made in the field and studies made in the laboratories on the birds of North America.

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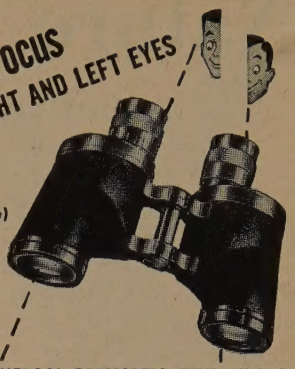

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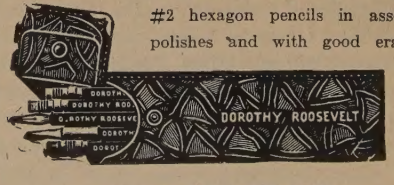

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Nature in Print

By HOWARD ZAHNISER

About two centuries ago Gilbert White wrote (and demonstrated for his own time) that "all nature is so full, that that district produces the greatest variety which is the most examined." Quoting this observation made in far-off Selborne, Lorus J. Milne and Margery J. Milne have assembled in a fascinating volume called *A Multitude of Living Things* a series of articles, each of which is an evidence of the interest to be realized in sharp observation. For readers in a wide variety of environments they have provided a stimulus to intensive exploration near home, and as a warning against discontent they cite a neighbor of theirs who would "lash a canoe to the top of his car and drive off to the wilderness, there to paddle a hundred miles," yet would continually complain "about the lack of places to hike around our small Pennsylvania town." Dr. Mr. and Dr. Mrs. Milne (or how does one deal with such titles when a man and his wife both hold Ph. D. degrees?) promptly show in their introductory article that in the beechwoods nearby (both to themselves and their discontented neighbor) there is an abundance of life: "Every cranny, each inch of leaf or loam is inhabited by a variety of active creatures." Yet it is plain through inference that their criticism of the neighbor and others like him is not in the far-away quests but in the blind discontent near home. For they themselves have traveled far, as their subsequent chapters reveal, and they have enriched their own records from the great store of fact and incident in the literature that can be as near at hand as one's own bookshelves. "We would like," they say, "to share with others our pleasure in field observations and suggest how modern, personal discoveries can blend with the heritage of writings on natural history from the past." This they have done well, and they have brightened their book with a collection of excellent photographs that are among the rewards of their own excursions.

A Multitude of Living Things is thus a peculiarly interesting book. One shares in reading it the intense homey joys the Drs. Milne have in their own intimate discoveries. Yet the range of the book's multitude is much greater than the environs of a small Pennsylvania town, including distant caves, seashores, and the sea itself. Its detailed descriptions of the life histories of caddis-fly, snails, sexton beetles and other easily overlooked creatures communicate not only facts but also the experience of marvelling that they stimulate. And in other chapters the Milnes have gathered together much wonderful information on such subjects as eyes and animal calls. One feels on laying down the book that he has gone far from the at-hand area where it seemed at the outset he was about to settle for intense examination, yet he is well satisfied with the experience and grateful also for the further suggestions on reading with which the Milnes conclude: "A naturalist who has enjoyed the writings of the many who have gone before, is richer for his reading, and sees more in the field."

Fortunately, if one wishes also to read a fresh and thoroughgoing demonstration of the Milnes' introductory theme it is charmingly at hand in Malcolm MacDonald's *The Birds of Brewery Creek*. Here, indeed, is a book in the tradition of Gilbert White, and one that has the same elegant and simple literary quality with which Viscount Grey of Fallodon emulated the natural historian of Selborne. It is a volume of real intrinsic value, one that would be deeply satisfying under any authorship, yet its charm is surely enhanced for any reader by his consciousness that the writer is the son of the former Prime Minister, the late J. Ramsay MacDonald, and was himself, while serving during the war years as High Commissioner for the United Kingdom in Canada, following the bird-watching tradition of British statesmen by exploring a creek that lay almost opposite his Ottawa residence.

"One day in July 1944" he tells in a passage that well represents his style of writing, "I paddled my canoe into it and found it a pleasant haven inhabited by some interesting birds. Soon I fell into the habit of crossing to it most mornings. The expedition gave me exercise and fresh air and a daily glimpse of the peace and beauty of Nature. Moreover, I discovered that the place was truly a paradise for an ornithologist. . . . Sea birds, river birds, lake birds, marsh birds, shore birds and land birds all come to it sooner or later. I watched them from the middle of 1944 until the end of 1945. My observations were scrappy, for work kept me in an office all day, and I could only cross the river for an hour or two in the early mornings, before breakfast, and occasionally for a short while in the lunch hour or in the evening. However, . . ."

The quotation may well end here, for the "however" is essentially the rest of the book. In these eighteen months the High Commissioner saw 160 different species of birds—not only saw but observed them so earnestly that he can now so describe and interpret what he saw as to merit the interest not only of laymen but also of experienced ornithologists. There have been few books that seem so well suited for both general and specialized readers. Within it are studies of bird territories and display habits that will surely seem significant to ornithologists, yet there are few readers with no knowledge of birds who would not be charmed with such descriptions as that of Mr. MacDonald's intimate and sympathetic observations of one notable family of yellow warblers.

"The superior judgement of this young family in staying longer in the nest," he writes, "was perhaps due to a better up-bringing. Their mother was a remarkably capable little creature. . . . This mother alone hatched all her eggs and then kept a wise authority over her youngsters until they were really able to fly. Her whole conduct from the moment when she arrived in the creek and started building her nest had been a model of wifely and maternal devotion and efficiency. I felt that it was not only a pleasure but also an honour to know her."

There are many such highlights in *The Birds of Brewery Creek*, and a reader finds himself enjoying pleasure and a sort of honor in knowing this author, too. There is a spicy admiration excited, for example, in reading of Mr. MacDonald's protection of a flock of yellow-legs from a law-breaking shooter. "I hated to see such lovely creatures killed," he explains, "and once, in my desire to save a little flock of them, stepped from behind some bushes and offered myself to their persecutor as a substitute. I explained that he could as lawfully shoot me as the shore birds. With his gun half raised he looked me up and down in disgust—and whilst he did so the Yellow-legs flew jauntily away."

Few shooters have the choice of a High Commissioner for a

Poetry of Conservation

By OSCAR OSTLUND

Whoever builds up, lovingly, a wall of stone,
or plants a tree, expresses poetry;
And poet likewise, in his heart, is he
who humbly leaves the natural thing alone;
Rapt by the sight of creatures in the wild,
the bird, or flower,
Which most inspire him who loves them in
their native bower.

target, and few commissioners, high or low, would provide a poacher with such an alternative to a shore bird!

On another occasion, when "the absolute peace of Nature had a comforting quality, like a blessing," when "sky and earth were serene and the water was as smooth as polished marble," and Mr. MacDonald had promised himself "an excellent morning's bird-watching," a gun shot "broke the silence" and shocked him into the realization that a new season had begun.

"I had forgotten the date," says Mr. MacDonald in describing the incident, in the course of which shot fell all around himself, too, and reminded him of shrapnel in the streets during the London Blitz. "It was September the 9th. Duck-shooting had begun. My heart turned sick. I felt angry with the men who had arrived to destroy an experience of such perfect beauty as visiting the creek in the early morning. I reflected sadly how hitherto the duck had been confiding and almost tame, so that they let me approach close to them—and how they would never show that trust again. It was bitter to realize that from now on they and I would be enemies."

There are many indications that an increasingly large number of modern men and women will be seeking more sanctuaries from hunters, in both land and water areas, and coveting the privilege of having more areas where wildlife can be enjoyed in fall and winter months as well as in spring and summer. To such readers Mr. MacDonald's testimony will seem most significant and will be appreciated even more in its full recording than in its representation through excerpts. Many will be especially interested in Mr. MacDonald's candor in recognizing that his intense dislike of the shooters was, in his own words, "of course unreasonable."

"Men who are free beings," he reasons, "develop various tastes. Many different characters compose a community, and God presumably made them all. He feels as compassionate towards the duck-shooter as He does towards the duck-watcher. My pleasure in studying birds alive was not morally superior to those sportsmen's pleasure in shooting them dead. Morals did not enter into the matter at all. I preferred one form of activity, they preferred another, and we each pursued our own particular pleasure selfishly."

"Nevertheless," he concludes, "I personally took an unfavourable view of those men."

Only the dramatic and unexpected nature of these incidents, and one's seasonal awareness of the shooting now going on in so many other bird-watchers' haunts, could, however, give such emphasis to these parts of *The Birds of Brewery Creek*, occupying as they do only some half-dozen of its more than 300 pages. Far from being characterized by such disturbances and perplexities, the book is actually a volume of delightfulness, and its reading is an experience of the peace and serenity and mild excitement that have such a tonic value for all of us, even as they had for this doubtless much perturbed high official in the midst of a war in which he was tensely busy. Then, too, the book is something more than a bird book. Chronicled month by month, these bird happenings are a calendar of the outdoors, and Mr. MacDonald sensitively places them for his readers in their settings of seasonal changes of vegetation and weather.

So excellent seem the writing and the structure of *The Birds of Brewery Creek*, as well as the content, that one is led to predict for it an endurance in the literature of the outdoors that we share with Canada, the United Kingdom, and all who read English. Brewery Creek itself may well become renowned. "Its waters run modestly," Mr. MacDonald says, "here between crowded shacks and there amongst grassy waste land, round the edge of the neighbouring city of Hull and eventually, about a mile downstream from the Parliament Buildings, pour themselves into the Ottawa River." It may well become one of those modest "most examined" districts to which Gilbert White's predictions may be applied. Surely it will now have an increasing charm for other bird-watchers, and were one a Canadian one could suggest that the Government might some day see fit to make of it a sanctuary—here where the wartime High Commissioner for the United Kingdom in Canada so well proved the benefits of bird watching and once offered himself as a substitute for shore birds.

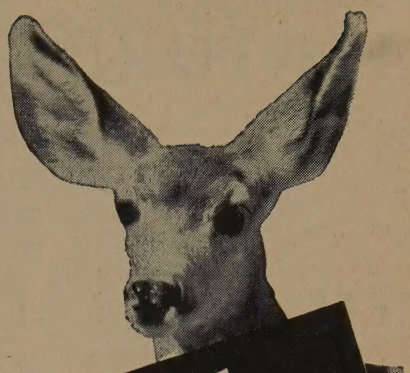
A Multitude of Living Things. By Lorus J. Milne and Margery J. Milne. New York: Dodd, Mead & Company. 1947. 278 pp., with 23 photographs on 16 plates, end-paper photograph, notes and literature references, and index. $4.

The Birds of Brewery Creek. By the Right Honourable Malcolm MacDonald. London, Toronto, and New York: Oxford University Press. 1947. 334 pp., with 23 full-plate photographs (7 in full color), and index. $5.

Rocks and Minerals

Rocks and Rock Minerals. By Louis V. Pirsson and Adolph Knopf. New York. 1947. Third Edition. John Wiley and Sons. 349 pages. Illustrated. $4.00.

First published in 1908, no new edition of this textbook has been undertaken since 1925, and the lapse of years has made revision necessary. Changes in classification of igneous rocks have been made in the interests of logic, and chapters on the sedimentary rocks have been rewritten. Definitions have been clarified throughout to aid the layman.



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Illinois Coots

At Grassy Lake, Illinois, on October 1, 1947, a special season for the shooting of coots was opened by the firing of a special bomb at 7:00 A.M., by Livingston L. Osborne, Director of the State Department of Conservation. It was estimated that 2000 gunners were present and 2400 coots. This is so far under the 1 to 40 ratio previously commented upon in our columns as to suggest that proper abundance of game no longer is a factor in the establishment of an open season. If the mighty Nimrods of Illinois are satisfied with a hunter-coot ratio of about 1:1, their standard has fallen deplorably low. Why we continue to label as conservation our current treatment of wildlife is a complete mystery. Neither the hunters nor their leaders appear to know what conservation is, or, indeed, to have any interest in the matter, if we may judge by this Illinois incident.

Important Reports

William Vogt is Chief of Conservation Section of the Division of Agricultural Cooperation of the Pan American Union, a distinguished naturalist and conservationist whose acquaintance with the conservation problems and possibilities of Central and South America is second to none. Although they are not as complete as he would like, his reports on the population and natural resources of Venezuela, Costa Rica and El Salvador are important contributions in this field. These studies, published by the Pan American Union, lay the groundwork for conservation policies in those countries, and for programs that could avert wasteful exploitation and assure wise use of what Nature has bestowed upon each republic.

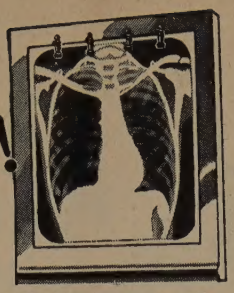
Jack Miner's Story

Jack Miner and the Birds. By Jack Miner. Chicago. 1947. The Reilly and Lee Company. 302 pages. Illustrated. $3.50.

This is a new and enlarged memorial edition of this book by and about a man who loved and lived with the birds. The new edition includes as chapters articles that have appeared in magazines and have not hitherto been gathered in one place. These round out the Jack Miner story.

Forest Facts

Two by-products of the reappraisal of the forest situation conducted by the U. S. Forest Service are bulletins entitled "Protection Against Forest Insects and Diseases in the United States" and "Wood Waste in the United States." Both booklets bring out that loss from insects and diseases and from waste in harvesting and wood use is appallingly high.



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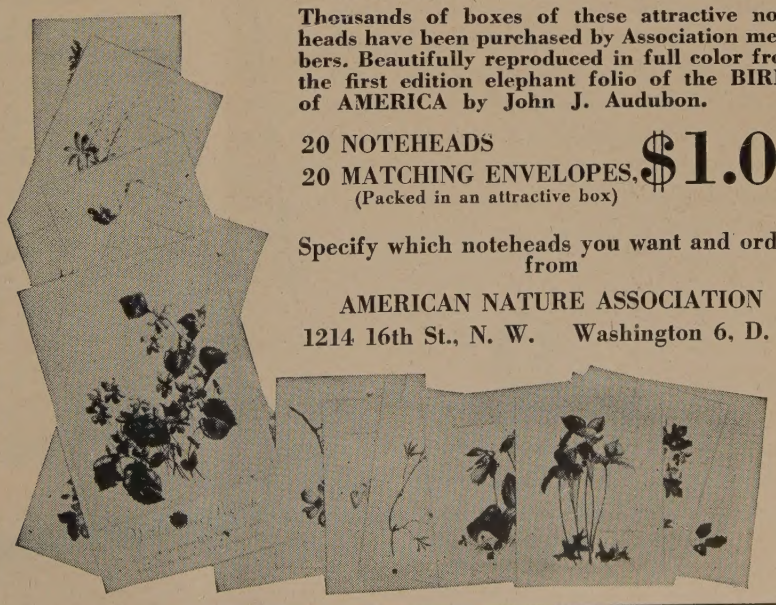

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Contents Noted

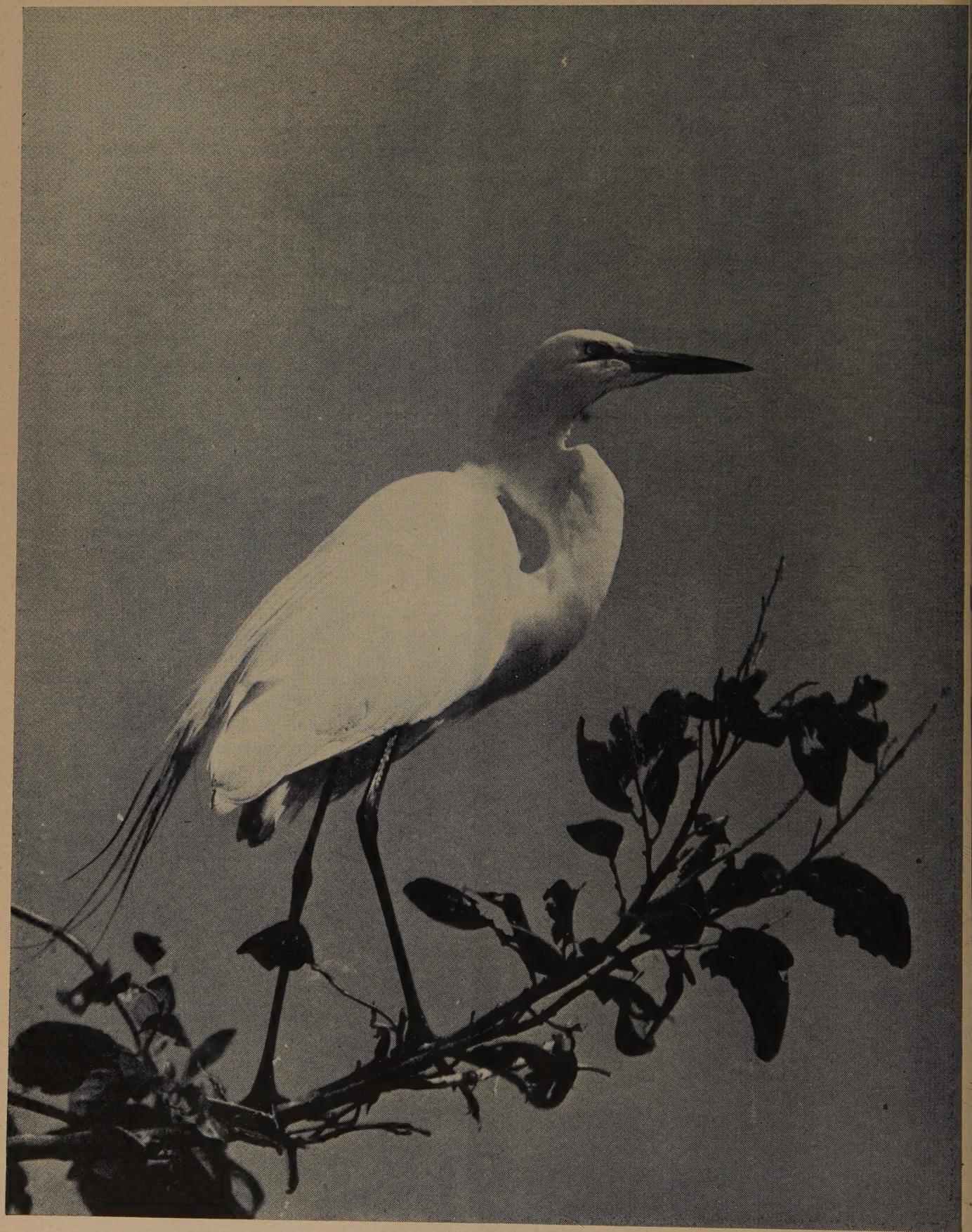
"To our way of thinking roadside advertising is a disgrace to America," writes Mrs. Chris Frederiksen, president of the Askov Garden Club, in *The Minnesota Horticulturist*. To give action to its convictions, this club has set out to preserve a specimen of what a highway should be. A new route was cut through from Duluth through Askov, and the members of the club set to work to protect its environs before the billboard concerns could move in. Every property-owner along the highway was visited and asked to sign an agreement to keep the billboards off. "Only one property-owner hesitated to sign the agreement," says Mrs. Frederiksen. "Nearly every farmer approached was eager to sign. Several expressed in no uncertain terms their opposition to roadside advertising." Having enjoyed such cooperation, the garden club launched the Evergreen Memorial Drive as a memorial to veterans of St. Louis, Pine and Carleton counties. Thus one stretch of highway will remain unexploited and beautiful, a symbol of man's service to his country instead of the disservice rendered by the parasitic billboard.

THINGS are buzzing in bee breeding according to a recent report. As we understand it, artificial insemination of queen bees has been possible for some time, but how to use this to keep pure blood lines eluded the bee culturist. Now Otto Mackensen and W. C. Roberts, respectively of the Louisiana and Wisconsin Experiment Stations, have discovered and perfected a system of giving unmated queen bees a dose of carbon dioxide gas anesthetic, causing the queens to lay eggs that hatch into drone bees. This speeds up production of hybrid bees that are specially good honey-producers and pollinators, and enables absolute control of parentage. J. I. Hambleton, U. S. Department of Agriculture bee specialist, says that, with the combination of these discoveries, "even a son of an unmated queen can be used for mating purposes, thereby making possible closer inbreeding." All this sounds to us most amazing—and a little indecent—not to mention bee-wildering.

BREAK out that spading fork and hoe if you live where you can farm in winter, or have these tools ready for spring. The Victory garden has come back into the spotlight, although a new name has not yet been found for it. Perhaps it might be called the Friendship Garden, since the call is out for home production of foodstuffs so that there will be more to ship overseas. The National Garden Institute and the Secretary of Agriculture join in this plea as a part of the *waste less, eat less* program. As we write this we have just finished our fourth consecutive luncheon without bread or butter, neither of which we missed in the least. We did not even think to ask for this gastronomic sideline, although we noted that quite a number of luncheoners did so. As a matter of fact, we have none too much confidence in the general self-denial of Americans; we are a pretty spoiled lot, eating more than is good for us, and wasting atrociously. So perhaps the produce more program offers the most resultful possibilities, although if something can be devised to check our wasteful habits we will look into the future with more confidence. P.S. Freedom Garden is the official name, in our opinion a selection that is too abstruse, requireing a lecture on ideologies to explain it.

ONE of our correspondents sends us a copy of the *Toronto Globe and Mail* calling particularly to our attention Jack Hambleton's outdoor column, given over for the day to Izaac Hunter, outdoor writer of the *Montreal Gazette*. It is not good hands-across-the-border stuff to comment unfavorably on our sister country to the North, but we can safely quote from the Canadian, Hunter, who writes of the moose: "Illegal slaughter of this great animal in recent years has been appalling. Lumber jobbers feed their shantymen with moose meat instead of beef. . . . Ninety percent of the moose killed by hunters for years past have been called out at night during the mating season and illegally shot down at short range in the glare of jacklights. . . . What is happening to the moose is also happening to the deer." Of ruffed grouse he says: "In Quebec they are becoming more and more scarce, but if you know who to whisper to in many of the clubs (particularly those with a political flavor), restaurants and hotels in our urban centers, you can have partridge brought to your table as pigeon, guinea fowl, or what have you."

ANOTHER Christmas season has rolled around with the dove of peace as hard to find as an ivory-billed woodpecker. Merry Christmas, anyway, and may we find the dove in 1948.—R. W. W.

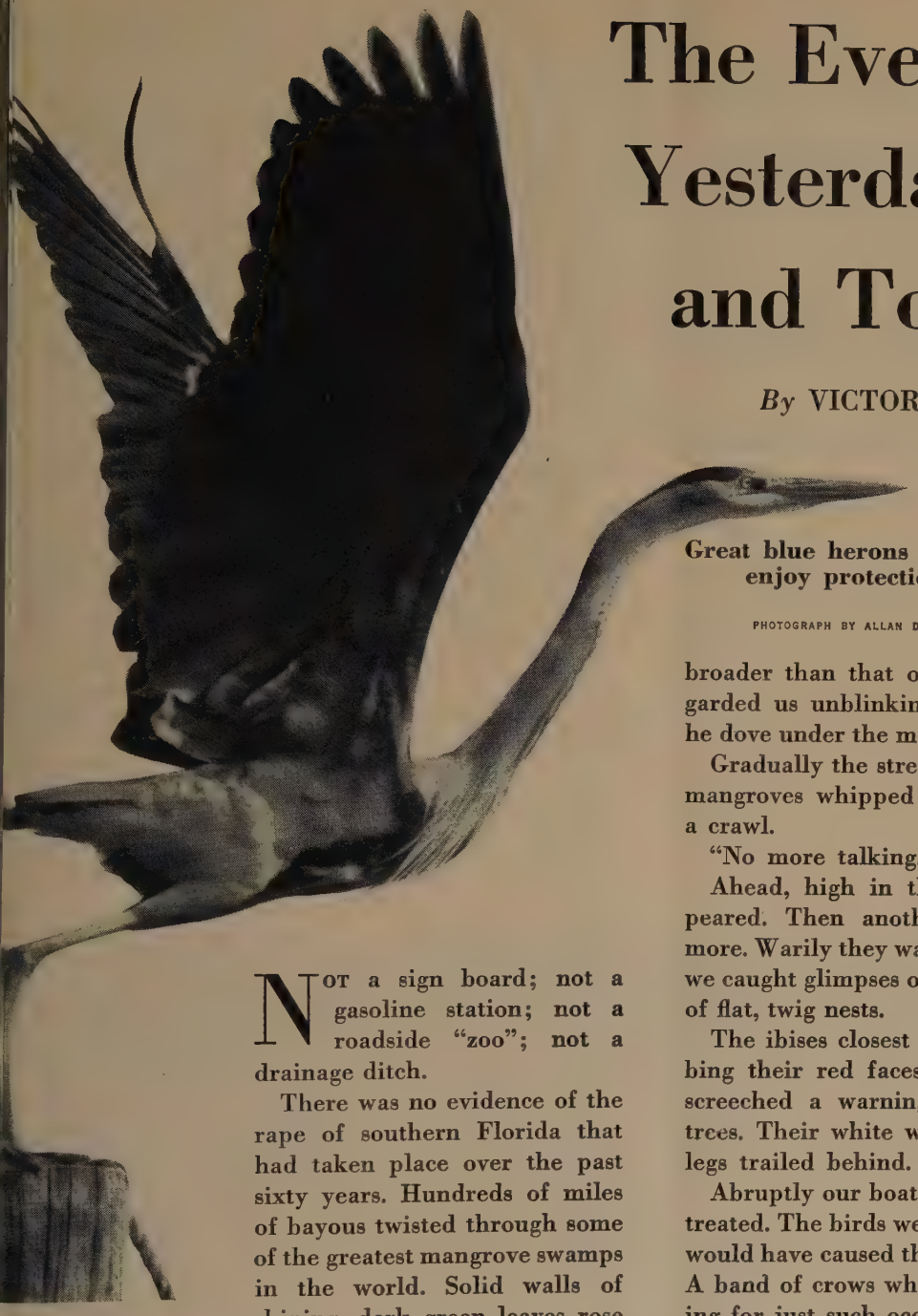


PHOTOGRAPH BY ALLAN D. CRUICKSHANK FROM NATIONAL AUDUBON SOCIETY

American egrets, along with their close relatives, the snowy egrets, now number in the thousands in the area that has been set aside for posterity in the Everglades National Park.

The Everglades—Yesterday, Today and Tomorrow

By VICTOR H. CAHALANE



Great blue herons are among the birds that will enjoy protection in the new park area.

PHOTOGRAPH BY ALLAN D. CRUICKSHANK FROM NATIONAL AUDUBON SOCIETY

Not a sign board; not a gasoline station; not a roadside "zoo"; not a drainage ditch.

There was no evidence of the rape of southern Florida that had taken place over the past sixty years. Hundreds of miles of bayous twisted through some of the greatest mangrove swamps in the world. Solid walls of shining, dark green leaves rose twenty feet high from the brackish water. Here and there they parted to show the network of aerial gray roots. Like flying buttresses, these roots arched through the air and supported the trees in their beds of muck and water. Now and then the forest grew larger, and an occasional giant mangrove raised its crown eighty feet above the ooze.

As our outboard motor whined by a grassy swale along the Shark River, we saw a runway more than two feet wide leading away from the water. The grass, flattened to the ground, was muddy and still damp.

"'Gator, and a big one!" muttered our boatman. Around the next bend, where the mangroves fell back to give the water room, the alligator floated. His massive back was cautiously awash. The snout was broader than that of a crocodile. His cold eyes regarded us unblinking. Then, with a mighty splash, he dove under the murky waters and was gone.

Gradually the stream narrowed and the tips of the mangroves whipped us on the turns. We slowed to a crawl.

"No more talking," cautioned our guide.

Ahead, high in the mangroves, a white ibis appeared. Then another—another—then a dozen or more. Warily they watched us in silence. Back of them we caught glimpses of many more, and here and there of flat, twig nests.

The ibises closest to us stiffened with alarm. Bobbing their red faces with long, curved beaks, they screeched a warning, then flew back through the trees. Their white wings flapped and their long red legs trailed behind.

Abruptly our boatman swung us around and we retreated. The birds were too nervous. Further intrusion would have caused the entire flock to leave in a panic. A band of crows wheeled overhead. They were waiting for just such occurrence so that they could feast on the unprotected eggs.

The following day we started on another trip to visit a wood ibis rookery on East River. These larger birds, we were told, would be much more tolerant of human intruders. As we neared the nesting grounds, the great white birds began to swoop overhead on black-tipped wings. Gradually, above the beat of our outboard motor, we became aware of a rising clamor. At first very faint, it rose and fell and became even louder and more shrill. Then, rounding a last island of trees, the sound became a din of bird voices. We had come into one of the largest rookeries to be found in the Everglades National Park this year.

There was "standing room only." Thirty thousand huge white birds with dark heads and dark, long, stilt-like legs sprouted from the foliage. Every branch

of every tree seemed to be occupied. Each bird screamed its curiosity, alarm or defiance, according to its race, age or disposition. Angrily the wood ibis adults croaked, shrieked, and flapped their wings, which spread five and a half feet.

The egrets gracefully displayed white gossamer plumes that are worn only during the breeding season. Some of them made gurgling calls; others turned their backs and ignored us. Snake-like water turkeys screamed and sailed off, leaving their downy brown young in their stick nests. A great white heron rose and took off on his seven and a half foot spread of wings.

The many hundreds of wood ibis young, still downy, were almost as large as their parents. Tall and ungainly, they stood singly or in pairs on the rickety stick platforms that served as nests. Their long faces were as dull and solemn as those of mules. Years ago one of the rookeries in the Everglades is said to have numbered a million birds. The noise and stench of thirty thousand are enough to satisfy most bird enthusiasts.

A few miles farther, we stopped our motor to watch a long file of wood ibises flying in from Florida Bay. Their crops were filled with shrimp for their young.

BANG! BANG! A blast from a double-barrel shotgun shattered the column of birds. Frantically they swerved and swooped in all directions. Their shrill cries pierced the skies. Two white bodies plummeted quickly to the ground.

BANG! BANG! The shotgun rang out again.

Poachers were still at work. They may have been disgruntled game hunters who had had no luck, or fishermen looking for easy targets. The wardens of the National Audubon Society, and, recently, of the Fish and Wildlife Service, have done an amazing job, but they could not cover considerably more than a thousand square miles at one time. Poachers ride around in "glades buggies" and pretend to be picnicking. Their pick-up trucks with high airplane wheels travel over ground and through water.

For centuries after its discovery, south Florida had been little disturbed by white men. Remote, mysterious, it was guarded by natural defenses. Swamps stretched into the horizon. With saw teeth on each side, the blades of grass were so sharp and so tough that they shredded clothes and tore into flesh. Men used copper wire for laces in their knee-high boots.

Travel through the low tangled branches and aerial roots of the dense mangrove forests was all but impossible. Clouds of blood-sucking, malarial mosquitoes hung over the bayous like heavy veils. A legion of rattlesnakes and cottonmouth moccasins threatened death to any intruder. Mammoth-jawed crocodiles and alligators were common. Bartram wrote that in the St. Johns River these huge reptiles lay so

PHOTOGRAPH BY VICTOR H. CA

close that they formed a living "bridge" from bank to bank.

Eventually commercial exploitation began its conquest. Feather hunters slaughtered millions of spectacular birds. Creeks and backwaters ran red with their blood. Snowy and American egrets, white and wood ibises, roseate spoonbills, great white and other herons, the terns, the gulls, the pelicans and many others. No species was too insignificant. Nearly every woman wore feathers in her hat.

Alligators were sought for the skins of their bellies until individuals of any size were rare. The less common crocodiles became even more scarce. Deer and other game animals were hunted to the vanishing point. The huge sea cows (manatees) and sea turtles almost disappeared. Fish were dynamited and netted in enormous quantities.

Orchids were torn from their tree perches and shipped out in crates. Lumber was cut without thought of reforesting or resulting destructive fires. Grazing of domestic cattle destroyed food for many original inhabitants and caused erosion.

The most far-reaching and long-lasting damage has resulted from water drainage. Dikes around agricultural developments to the north of the Tamiami Trail shunted eastward great quantities of ground water that formerly had moved southward. As a result, vast areas of the once water-soaked Everglades are being converted into parched savannas.

Many miles of ditches were sliced out of the shallow soil and coral rock in numerous parts of south Florida. Nobody stopped to think that draining the swamps would let in the salt water from the sea. Nobody stopped to think that over vast areas the soil was no good for farming. Instead, the excited promoters and engineers continued to dredge more and more drainage canals.

Sea water seeped farther and farther inland as the hydrostatic pressure of the fresh water lessened. The types of water plants, fish, shellfish and crustaceans that originally swarmed in the pools, bayous and lakes were killed by the brine.

In the comparatively few areas where the land proved fertile, the owner's pleasure was usually short-lived. Sugar and vegetables have been raised with spectacular success in some cases. But the shallow soil shrank and oxidized. It also burned easily and blew away. All this was due to the draining of water from soil that consisted almost entirely of organic matter.

Man-made and lightning fires have spread over the newly dried areas year after year. More than a million acres have been burned in a single year. In many instances the soil has been burned off to coral bed-rock or left for erosion. According to Governor Caldwell of Florida, millions of dollars worth of land in the Everglades is destroyed every year. *He prophesied in 1947 that in fifty years there would be no Everglades!*

In ignorance and greed, man has interfered with the intricately balanced schemes of Nature. Not only has his drainage and subsequent fires consumed the shallow layer of soil formed by decay of thousands of generations of plants—it has started an endless chain of disastrous conditions.

For instance, that rare bird, the Everglades kite, cannot exist without *Pomacea* snails. These large,

PHOTOGRAPH BY ALLAN D. CRUICKSHANK FROM NATIONAL AUDUBON SOCIETY

Wood ibises festoon the trees and large shrubs in one of the Everglades rookeries.

←

A white ibis on its rough nesting shelf will enjoy security in the new park area.

→

PHOTOGRAPH BY THE AUTHOR

Air plants growing on young cypress trees in the Everglades. These are not parasites on the host trees, however.

freshwater snails cannot exist without dampness. When we drain their habitat, we start a chain of destruction. We destroy not one resource, but four. We destroy the soil, the vegetation, the snails, and the kites. Resulting spread of fires continues the sequence. More drastic destruction of vegetation and soil follows. The remaining birds and animals flee the country or are burned to death.

We have upset Nature's apple cart. No one can estimate the TOTAL damage, nor its long endurance.

PHOTOGRAPH BY THE AUTHOR

Tree snails are colorful and interesting residents of the Everglades, but they require moisture to live and drainage has reduced their numbers.

A lonely grave on the shore of East Cape, at the southernmost tip of the Everglades, marks an early attempt to stem the rising tide of destruction in south Florida. It was here that the body of the first Audubon Society warden in this part of the country was washed ashore. He had been shot and killed while trying to carry out his duty of protecting the birds. His murderers escaped punishment because of the sympathy of a local jury. A small plaque on his gravestone reads:

Guy M. Bradley
1870-1905
Faithful unto death
As game warden of Munroe
County he gave his life for
the cause to which he was
pledged

Tears were shed for Guy Bradley, his orphaned family, and the destruction which he fought. But these tears were crocodile tears. The rape of the Everglades continued. The great and good work of the American Ornithologists' Union resulted in the establishment of the first bird refuge—Pelican Island, on the east coast of Florida. Later, Congress enacted legislation that led to setting up additional bird and other wildlife refuges. They were steps in the right direction, but they were inadequate. Plunder and waste were not stopped, but continued to march, side by side.

Apparently the only means of rescuing the wildlife resources before it was too late was to establish a national park. Thirteen years ago Congress agreed to accept a two-million-acre tract to preserve this area for future generations—when and should the State of Florida acquire and present the land to the nation.

This area had no agricultural value. It did have vast reservoirs of a greatly varied and unique wildlife. But there were too many people who hoped to "strike it rich" with the discovery of oil or gas. Many of them continued their search. Naturally they refused to sell their claims except on the basis of high speculative values.

At last, half of the proposed area has been secured. On June 20, 1947, it was accepted by the Federal Government for a national park. This 701 square miles is to be "permanently preserved as a wilderness." No developments are to be undertaken "which will interfere with the preservation intact of the unique flora and fauna

PHOTOGRAPH BY THE AUTHOR

Coconut palms in the Cape Sable area of the Everglades. These emphasize the tropical character of the region, our only tropical National Park.

and the essential primitive natural conditions now prevailing in the area." Eventually this park will be doubled in size. Florida has presented a check for two million dollars for this further acquisition. It will stretch from north of the Tamiami Trail to the northern fringe of the Florida Keys, and from Royal Palm Hammock to the west coast islands.

Two million acres of land and water — white, shining beaches; turquoise, shimmering sea; mangrove-covered keys suspended in the air by mirage; islands of waving palms; vast swamps of saw-grass prairies. Gray pillars of cypress trees drip with long festoons of "spanish" moss; in their branches, rare showy-flowered orchids and clusters of air plants of the pineapple family. With their aerial roots, these epiphytes cling to the trunks and branches and absorb their food from the air.

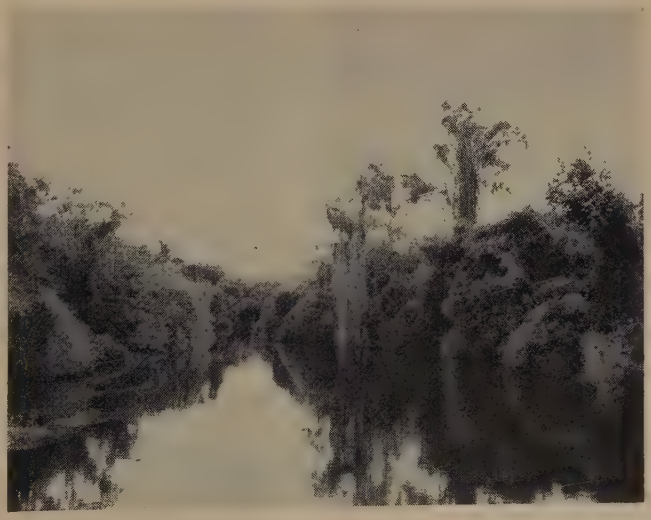
The strangler figs climb around their tree victims with an embrace of death. The hammocks are jungles of such tropical trees as gumbo limbo, Madeira mahogany, wild tamarind, mastic and Cuban palm. Under them is a dense growth of paradise tree, wild coffees, satin-leaf, Jamaica dogwood and other shrubs.

The Everglades are the only tropics in the United States. Their lush, riotous vegetation is said to have harbored occasional criminals for years at a time.

It was here that the Seminole Indians were able to fight longer and at more cost to the United States than any other Indian tribes. For years there was a price on the head of every Seminole—two hundred and fifty dollars for every squaw or child captured alive; five hundred dollars for every buck. A few remnants of the tribe remained theoretically at war with the United States until *1938*. The white man had wronged them repeatedly. They could not forget nor forgive that.

PHOTOGRAPHS BY THE AUTHOR

A scene in the tropical, jungle-like Everglades, water hyacinth in the foreground. Below, Turner River in the Everglades National Park



Now American citizens, a number of Seminoles live on a reservation near the boundaries of the Everglades National Park. Outstanding Indians like William McKinley Osceola, Jim Tiger and John Jumper have given assurance that their people will obey the park laws, even to giving up their easiest game there—frogs and garfish.

Can the Park Service eliminate poachers, the fishermen who still dynamite and "stop net," the amateur and professional collectors of orchids, the camera fanatic who will want to disturb bird colonies and trample on delicate coral?

Can the Park Service correct the costly mistakes of drainage, fires and erosion? At least ninety percent of the millions of acres of Everglades' fires are human in origin.

Can the Park Service restore the depleted wildlife? We cannot improve on Nature. We have learned that lesson the hard way. We can undertake some positive management; restore the natural flow and seepage of fresh water; plug the ditches that now admit salt water to the interior of the park; bring in seed-stocks of animal species that have been wiped out and are not likely to return unaided. We can also help Nature by not interfering with her efforts to help herself. Where sufficient breeding stock survives, the animals may be expected to increase to their natural limits with no other assistance. They need only to be left in peace.

Alligators and crocodiles are still eagerly hunted for their scaly hides. Only their bellies are used by most tanners; the rest is ordinarily thrown away. Prices have reached an all-time peak. A few panthers (cougars) find food and shelter in the most inaccessible depths of the Everglades. Bobcats and raccoons are plentiful. Deer, black bears, gray foxes, skunks, otters, opossums, and gray (Continued on page 550)

Sled reindeer, which usually have their horns removed in winter for the greater safety of the drivers. These animals can be picked out in summer by the thong around the neck. The reindeer scratch for their food around tree roots, seeking lichens and mosses.

Santa's Remount Station

By DONALD B. MARSH

Photographs by the Author, who is Archdeacon of Aklavik, North West Territory, Church of England in Canada

WHILE Dasher and Dancer, Prancer and Vixen, Comet and Cupid, Donder and Blitzen may be as indestructible as Clement Moore's beloved poem that immortalizes these eight tiny reindeer, if Mr. S. Claus has need to remount his sleigh he could do so conveniently from the reindeer herd of the Arctic barrens of Canada. Whether or not these reindeer are needed to help bring Christmas joy to a world not too heavily endowed with joy these days, at least they vastly serve the people of the Mackenzie River Delta, while the mere mention of reindeer conjures up a picture of Father Christmas in his red suit, smiling through his flowing white beard.

Almost as epic as the annual aerial visit of Santa Claus is the story of the journey of the Canadian reindeer herd. In 1929 the Canadian Government purchased 2400 reindeer from the herds of Carl Loman in Alaska. Then Andrew Bahr and his Lapp herders set out on a drive that was to take them three years to reach the western bank of the Mackenzie, and three more years before the reindeer could be herded across to the eastern side and spread out where abundant lichens assured good grazing.

Slowly Andy Bahr and his five herders moved their charges across the barrens. Wolves dogged the herd. Wild caribou sought often to lure their tame cousins away. Good feeding grounds had to be scouted. Fawning time, the freeze-up and the break-up all presented their special problems. But the herd moved on, suffering inevitable losses, but also enjoying natural increases. Once the west side of the Mackenzie was reached, it was necessary to wait for certain conditions to be just right before the great herd could be driven across, and it was not until the third winter that conditions justified the crossing.

All this sounds like going to a lot of trouble, but the need of fresh meat for the Indians and Eskimos of the region was great. Caribou had failed for several years to visit the Richardson Mountains. The situation was acute, and reindeer seemed the answer.

Part of the Canadian reindeer herd near the Arctic coast. This picture was taken in the fall, just before the freeze-up and after the surplus had been taken to provide fresh meat supplies.

Well established today, the reindeer are the special charge of a Lapp chief herder named Michel Pulk. He loves the animals, and his hardest time is when the time of harvesting some of the herd for food arrives. I shall never forget Michel when he had been told to shoot some of the does in the herd at the annual "kill." He found the order hard to carry out, and seldom shot, explaining, almost with tears in his eyes: "It is a bad thing for the herder to have to shoot females. It is a hard thing for a good reindeer man to kill off stock." Yes, they seemed his children.

The annual harvest of surplus reindeer takes place in late September, when the herd is brought to the mainland on the east side of the Delta. The meat is sold to Eskimos and Indians, many of whom come for the event, at a reasonable cost—very reasonable, indeed, considering the cost of the herd. Also some meat is given by the Dominion government to the hospital and school in Aklavik.

On the morning of roundup, over the hill come the deer. First a few browse among the mosses, and then more top a rise, forcing the first in the field to come a little nearer. Now the main herd appears and slowly seems to roll over the brow of the hill against the blue sky. Now the herders can be seen, slowly walking this way and that, and the black and white sheep dogs race behind first this bunch, yapping at their heels, then behind another group, always moving themselves and always keeping the herd on the move. A whistle, a flip of the hand and the dog moves in response. He heads off the deer, who turn to face him while the leader, a big buck, lowers his head and swishes his horns as if in challenge. The buck draws back, turns and trots away, leading his retinue with him, while the dog, satisfied that he has done his job, looks to his master and, seeing no further signals, goes back to heel.

The whole 4000 reindeer are now in a body, their horns looking like a great, waving mass of writhing snakes, as they move, sway, rise, and fall, this way and then that. Gently they are turned until they mill, and the whole moving mass of animals now seems to be rotating around a central pivot, every beast going one way. Herders say that certain herds mill one way while other herds mill the opposite way, and that one herd never mills both ways. There are certain reindeer who are definitely leaders, and these are the ones that lead in a break from the circle. If once they start to stream away, there is no holding the herd, for they will all follow the leading animals.

A ride behind two sled reindeer is a wild experience, for the drivers have little control over the animals, who travel fast and where the whim takes them. Sled deer are used in moving the winter camp and in going from camp to where the herd is feeding.

Tom Oscar, one of the herders and a fine reindeer man.

As the deer circle, one repeatedly notices the same beasts on the outskirts; here is one almost white, another piebald, and another almost black. These beasts are among those that always stay on the outside of the herd, just as many of the others always stay in the center. Even though the herd may split up, these "file-closers" drift back to their original places.

This is a wonderful help to the herder, who can, by remembering certain animals, keep a good watch on the herd. If some of them, or even one, are missing, he knows that some of the herd have broken away and he must search for them.

The herd is now much quieter, and the herders, who have been standing quietly by, now slowly spread out, some walking into the very center of the herd with their rifles. Slowly they walk, and the deer seem to roll away from them and then sweep together and meet again behind them. Always there is that little distance from man, as if Nature tells them to be afraid. Now the deer pass by, and as each man sees his animal pass he fires, always making sure that nothing is behind. The deer are unafraid of the rifle shots and, indeed, are unafraid of their fallen companions, for they pass by with apparent unconcern. The toll mounts, and presently the herd begins to get restless. Slowly the reindeer are worked once more into a circle and milled for half an hour or so until they once more quiet down. So the day passes until the harvest is complete, and the herd is left to wander out once more. Two herders depart with them, circling them several times during the night to make sure that no wolves molest them and that none stray from the area where they are feeding.

After the first snow, the herd can move on to fresh feeding grounds, and a camp is sought where there is timber so that the herders may have fuel for their camps. The main camp is thus often as far as six or ten miles from the herd. Areas are marked out and used in rotation, so that no one area becomes denuded of lichens, which is the principal food of the reindeer. Often the winter camp has to be moved, and the sled deer aid in this task. Two are harnessed together to each hardwood sled, and the sled piled high with household goods and, if need be, with the herder's wife and children. A great procession then winds its way to the new spot.

For travel to and from the herd, the herders use their sled deer, and each man has two, which he first has to train to pull the sled and more or less obey him when in harness. A ride on such a sled is a wild experience, for in the main there is little control over the beasts, and they gallop rather at will. Up banks or down they go, shooting down a hill at breakneck speed, or gliding across the smooth surface of a lake. One has but to hold on tight and hope for the best. Hitching up is perhaps the worst task, for the animals are ever anxious to resist with hoofs and horns. Sometimes the older sled deer are more easily handled, and I well recollect seeing one old-timer wander into the main camp. He had broken away from his moorings, and seemed to take a delight in trotting along just out of reach of the lines of sled dogs, which became almost frantic in their efforts to snap at (Continued on page 550)

One of the sheep dogs trained to keep the herd intact and moving in the right direction. These dogs work on signals by the herders.

The sloth walked over the ground with such a slow and unsteady motion that he suggested a palsied old man. All his joints seemed to be rusty.

Adventures with Sloths

By ALEXANDER F. SKUTCH

Photographs by the Author

SLOTHS are small, long-limbed, stubby-tailed animals covered with long, coarse, gray hair, and they live among the tree-tops in the forests of tropical America. Their feet are equipped with exceedingly long, strong, curved nails, which they hook over the boughs of trees while they hang in an inverted position, back downward, and browse upon the foliage, which is their chief food. The three-toed sloths have three claws on each forefoot and hindfoot; the two-toed species bear only two nails on the forefeet, three on the hindfeet.

I have met sloths in widely separated parts of tropical America, yet rarely more than one or two in a day. But one April day, while voyaging along the still waters of a long, meandering lagoon in western Panamá, we saw five grown three-toed sloths, *Bradypus griseus*, in the trees along the bank, all within a distance of about a mile, and all on the same side. This was more than I had seen during the five months I had already spent in the same region, often traveling along the same lagoon, which was an earlier bed of the Changuinola River. Why this particular day should have been my "Sloth Day" I do not know. Four of the sluggish animals were in guarumo or trumpet trees, a species that springs up rapidly in new clearings and openings in the forest, and which is easily recognized by its open crown consisting of a few coarse branches springing in whorls from the slender trunk, and its great, long-stalked, palmately lobed leaves. These leaves are a favorite food of the three-toed sloths, which seem to prefer them to any other kind.

One of the sloths along the bank of the lagoon was a female carrying a cub clinging to her breast. She was descending the trunk of a trumpet tree, which she had left quite bare of foliage. We watched her climb downward until she disappeared among the bushes beneath. When not otherwise engaged, the sloths devoted much time to scratching all accessible parts of their body with their long claws, sometimes devoting half an hour continuously to this occupation, which they carried on in a sustained, mechanical fashion. One hung head downward while it scratched one foreleg with the claws of the other. Two of the sloths were resting upright upon the thick bases of horizontal branches, where the trunk served as a back-rest. With their heads bent forward and faces hidden between their arms, they were featureless masses of gray fur. Often one sees them sleeping so, especially in the rain. Thus they find

relief from hanging constantly back downward.

While we watched one of these sleeping sloths, a male, he awoke, uncurled himself, and began to climb out toward the end of a bough of the trumpet tree, advancing the right foreleg simultaneously with the left hindleg, and the left foreleg at the same time as the right hindleg. Every movement was made slowly, with great deliberation. Arrived at last at the end of the bough, he stretched out a long, thin forearm and, with its three hooked claws, drew in one of the big leaves, at the edge of which he began to nibble. At the rate at which this and other sloths ate, we estimated that one such leaf would keep him busy for half an hour or more.

While we watched this sloth feeding, Uriah, our black West Indian boatman, suddenly announced that he would capture it for me. I wondered whether he intended to climb the trumpet tree and take punishment from the ants that lived in the hollow trunk and branches and swarmed over the bark and leaves, which they are supposed to defend from the attacks of animals. But he soon showed that he had different plans. Jumping ashore, with his long machete he cleared a space in the close-set stand of tall wild canes that grew on the bank, directly beneath the sloth. Neither the rustling of the long cane leaves a foot or two beneath him, nor the crashing blows of the knife that severed the canes, caused the beast alarm. He merely moved his head from side to side with ludicrous deliberation, and appeared to ignore all that was happening below. When the opening in the cane-brake had been made sufficiently wide to permit freedom of movement, Uriah chose a long, stout cane and with a "withe", or length of slender flexible vine, tied a stick to its end to form a crude hook. The cane was so long and heavy that Uriah needed the assistance of his companion, King, to raise it up and hook it over the bough to which the sloth clung. Through all the movement, talking, and shaking of the branch, the animal remained perfectly quiet, as though nothing out of the ordinary course of his life were taking place.

The patch of short fur of variegated colors that marks the male of the three-toed sloth. Below, the sloth climbs deliberately down the trunk of the small tree that he found a "deadend".

The sudden pull upon which Uriah depended to break the bough and bring down the sloth failed of its purpose, because the hook slipped off. But the abrupt jerk served to awaken the beast from his lethargy. He climbed up the branch with determination, nay, even with what in a sloth must be considered haste, since at best a sloth must "make haste slowly". He did not even stop at the main trunk, but continued his steady advance or, rather, retreat, until he came to a natural halting place at the end of a limb on the other side of the tree.

Uriah prided himself upon his skill as a hunter of "tigers" (jaguars), "lions" (pumas) and other big game, and to have his skill as a bushman thus foiled by a beast so slow as the sloth must have caused him severe chagrin. With set mouth, he piled canes against the leaning trunk of the trumpet tree until he had made a sort of platform upon which he could stand with his bare feet. From this more elevated position he could barely reach, with the hooked end of his cane, the bough from whose extremity the sloth now hung. When he had at

The sloth hangs back downward in its usual position. The sloth's whole expression is one of utter stupidity and helplessness, but, on acquaintance, is appealing in its lack of aggressiveness and quiet resignation.

last caught the branch, he gave a sudden tug; the brittle, hollow limb snapped off under the combined strain of the sloth's weight and Uriah's pull. Still clinging tightly to the leafy end of the branch, the animal came hurtling through the boughs above my head and plunked into the shallow, weed-covered water at the margin of the lagoon. "The experiment worked, sir," was Uriah's only comment on his success.

The sloth lay partly submerged, head buried in the floating grass, still clinging to his bough and making no movement. The azteca ants, disturbed by their fall, swarmed out of the hollow internodes of the branch and stumbled through the animal's pelage, making valiant but ineffectual attempts to reach the skin. Now I understood how the sloth, protected by his dense hair, could browse upon the foilage of the trumpet tree without being bothered by the ants. A number of small gray moths, *Cryptoses choloepi*, ran about over his back, or took short flights, but always hid themselves again in the animal's long hair. They seemed to be permanent residents here, and all the handling that our captive subsequently received failed to dislodge them, until most were collected and sent to Washington with a request for information. The larvae of these moths, it appears, subsist upon the minute algae which form a green encrustation over the long, coarse hairs of the sloth's arms, neck and back. Apparently they do not attack the fur itself, for our animal's abundant pelage was in excellent condition, and far from moth-eaten. I did not actually find any of the moth larvae present, nor any external parasites of any sort on Uriah's sloth.

With his strong claws, the sloth had attached himself so firmly to the water weeds among which he had fallen that a few skillful touches of the machete were necessary to cut him loose and draw him into our skiff. Uriah made a noose in the end of a piece of pliable vine and tightened it around one of the beast's hindlegs. The sloth had been placed in the bow, and as the occupant of the forward thwart I was given the free end of the vine to hold. But this was a superfluous precaution; for although, as we later made sure, the sloth had not been injured by his fall into the water, he lay prone in the bottom of the boat, scarcely moving, during the two-hour homeward voyage.

As I sat before him on the bow thwart, I had ample time for the contemplation of the strange creature that had so unexpectedly become my possession. He was covered everywhere, except on the face and a spot between the shoulders, with long, coarse, flattened, gray hairs, the color of "Spanish moss" and of much the same "feel". This resemblance was doubtless not entirely fortuitous, for both "Spanish moss" and sloths hang from the boughs of trees in tropical regions. On the sloth's back these hairs were directed obliquely toward the middle line, so that they pointed downward when the animal hung beneath a branch in his customary position. Beneath the coarse pelage the body was covered with a soft, close, brown underfur. Between the shoulder blades, where the long hairs were lacking from an

area the size of the palm of my hand, the exposed underfur was particularly short, fine, and close-set. This area was marked in the center with a broad, black, longitudinal band, bordered on either side by orange-buff, which in turn merged into gray, black and brown at the edges. This more brightly colored patch in the midst of the gray was conspicuous at a distance and, when I first looked at it through field-glasses, gave the impression of a deep pit in the middle of the sloth's back. I later learned that this patch of short fur is the mark of the male sloth and proves to be completely absent from the females.

On the sloth's face the fur was short and close. His cheeks and forehead were very light gray, contrasting sharply with the dark brown frontal ruff, which was worn in a pompadour over the forehead. His short muzzle was black, his eyes muddy brown. During the day the pupils were narrowed to mere pin-holes, but in darkness they dilated widely. When the animal closed his thick eyelids, as he often did, the eyeballs receded into their sockets, much as with frogs. The minute ear-lobes, hidden amid the long hairs on the back of the head, suggested imperfect hearing; I found this and other three-toed sloths indifferent to loud noises of all sorts. The neck, covered with coarse hairs, appeared to be thicker than the narrow head. The sloth's whole expression was of utter stupidity and helplessness. Yet, as I came to know him better, I found something appealing in the absolute lack of aggressiveness and quiet resignation that this countenance betokened.

As I carried him from the boat-landing to the house, my sloth stretched his arms slowly in the direction of some trees we passed. This was the one sign of volition, the single gesture to intimate that freedom might be more agreeable to him than captivity, that the animal made on the long homeward journey. Placed in a wire cage on the porch, he clung all day in a corner, head bent forward between his arms, a picture of indifference or dejection. At night he became more active and climbed slowly about the cage. Although provided with foliage of the trumpet tree and leaves of other kinds, he ate nothing during the four days that he remained with us. He was not seen to drink, and he did not void excrement. To remove him from the cage for observation or photography was a matter of great difficulty, for his two-inch-long claws clamped the framework with an iron grip. Once in trying to make him let go I had a finger caught between these claws and the wire, and was held prisoner until Uriah, responding to my calls for aid, came with a screwdriver to pry up those rigid nails and release me from my bondage.

Set down in the midst of the lawn, the sloth would move his head from side to side with great slowness until he got his bearings. Then he would direct his course toward the tall banana plants in the far corner, beyond which grew a few trees of moderate height. If lifted up and turned around, as soon as he was released again he would infallibly orient himself toward the banana plants and the trees. This seemed to be a tropism with him, as a green plant bends, or a moth flies, toward the source of light. He might be classified as a "dendrotropic" animal. In crawling over the lawn toward the trees, he moved one foot at a time, with such a slow, unsteady motion that he reminded me of a palsied old man. All his joints seemed to be rusty. On the ground he was plantigrade, walking with hindlegs doubled up and forelegs stretched out, the long nails extended rather than doubled under. First he would move a hindleg, then the foreleg on the same side, then the other hindleg, then the corresponding foreleg. If thrown on his back on the ground, he would swing out one rigid arm with all the grace of a stuffed teddy-bear, and slowly turn over.

For purposes of observation and photography, we set up a small tree in the yard. When placed in the tree, the sloth would climb out to the end of a branch and here pause to look around and reach out a foreleg for something taller into which he could ascend. But the next tree was far beyond reach, so at length he turned away and closed his eyes drowsily, as though the problems of his life were too tremendous for contemplation. I repeatedly saw him do this when in a difficult situation. Once, when he was at the end of a branch vainly stretching out an arm for something beyond to climb to, it occurred to one of the men to wave a white handkerchief just beyond his grasp. The sloth slowly swung his long arm around, trying to reach the hankerchief. He would continue this as long as it was dangled in front of him. One who did not know the animal might well have thought that he was playing; but to me this was a stereotyped reaction, as when he reached for the limb of a neighboring tree. Yet, despite the slowness of his reactions, our sloth was able to profit by experience; for after he discovered that the little tree set in the yard was a "blind alley" leading nowhere, when placed in it he would promptly climb down to the ground instead of upward, as at first.

During the four days I kept this sloth he uttered no sound save a kind of sighing, caused by deep respiration, whenever he was suddenly and somewhat roughly torn from the (Continued on page 552)

Poinsettia

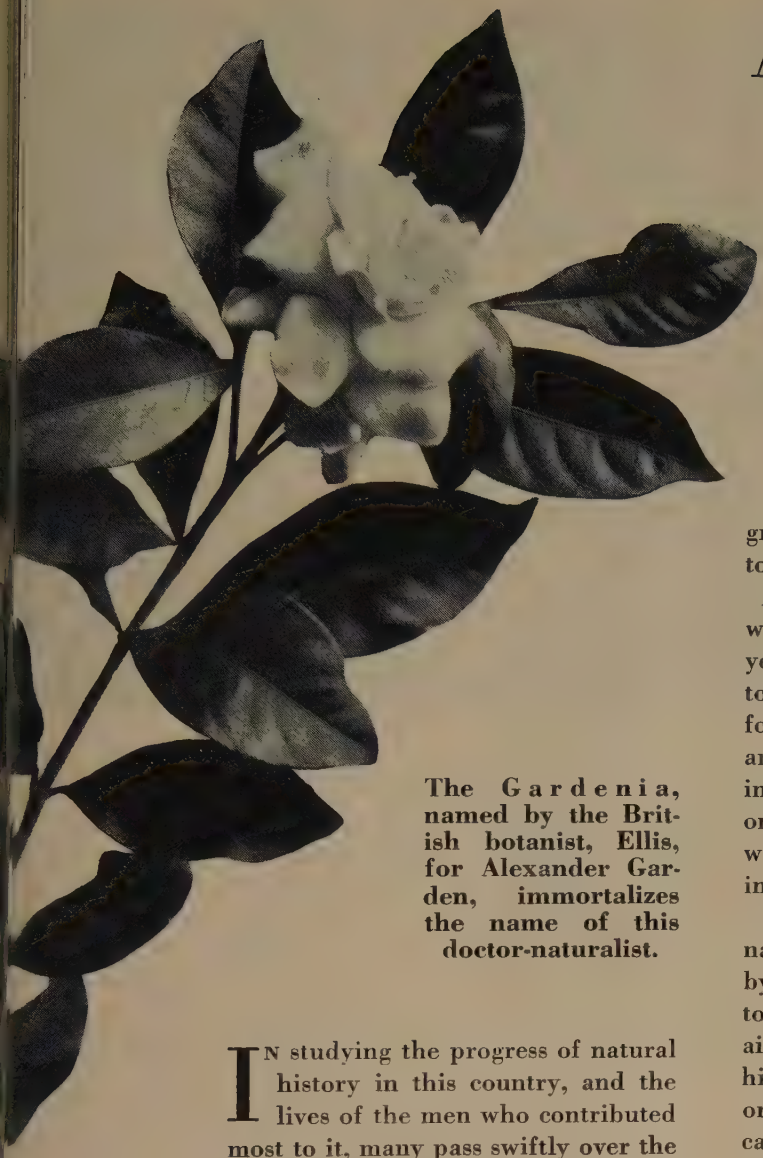
By MAE WINKLER GOODMAN

Flower of Christmas . . . shed your bloom
  Across the candle-lighted room;
Where holly blends with mistletoe
  Like rubies burning on the snow
You stand alone, in stately pride,
  Slender, graceful, dignified,
Your green and scarlet leaves unfurled
  To share the beauty of a world . . .
Flower of Christmas, here you are
  A crimson taper . . . or a star!

Alexander Garden: Physician and Naturalist

By CLARENCE and MARIE GOODNIGHT

Photographs from J. Horace McFarland



The Gardenia, named by the British botanist, Ellis, for Alexander Garden, immortalizes the name of this doctor-naturalist.

IN studying the progress of natural history in this country, and the lives of the men who contributed most to it, many pass swiftly over the name of Alexander Garden, merely remarking that the Gardenia was named in his honor by Ellis. While it is indeed true that Garden was not one of our greatest biologists, it is unfair to dismiss his name so casually. During a long residence in South Carolina, he did much to make our fauna and flora better known to the world. Since much of his work was done at the suggestion of Linnaeus, the faint light of Garden's studies pales in the brilliance of the great Swede; but it is really through the work of the minor satellites that the great luminaries like Linnaeus derive their force. It is from the careful plodding work of men like Garden that others have discovered great biological principles.

Alexander Garden was born in Scotland about 1728, the son of Reverend Garden of Aberdeen. Dr. Garden received his training at Mareschal College of the University of Aberdeen. His medical work was done under the direction of Dr. John Gregory, a famous botanist. No doubt Garden's interest in botany can be directly traced to the influence of this man. Shortly after his graduation, Garden was invited to come to Charleston to practice medicine.

In 1753, when he arrived from Scotland, Charleston was a rapidly expanding community. Founded in the year 1670, it was still suffering from the insecurity of too rapid growth. Commerce with England was the foundation of the town's economy. Manufactured articles were brought from the mother country, and indigo and tobacco were shipped in return. Situated on the coast to facilitate this commerce, Charleston was surrounded by low-lying swamps—natural breeding places for malaria and yellow fever.

By the year following his arrival (1754), Garden's naturally delicate constitution was further weakened by the rigors of life in Charleston, and he was obliged to take a trip North, as he said, in "search of cool air." This trip, which seemed only an interruption to his work as a physician in Charleston, was actually one of the most memorable events of his scientific career. When he arrived in New York, he immediately went to Coldenhamia, the home of the lieutenant-governor, Colden, who was interested in plants. Here, by one of those fortuitous incidents, he met John Bartram—one of the more eminent of the plant collectors of the new world. And for the first time he had the opportunity to examine critically the *Fundamenta Botanica* and *Classes Plantarum* by Linnaeus. The reading of these books opened a whole new field of thought to Garden. His early interest in the plant sciences was reawakened and soon became the dominating interest of his life—an interest that was to make better known the flora and fauna of South Carolina.

Upon seeing his absorption in these books, Bartram and Colden told Garden of their correspondence with Linnaeus. Garden's enthusiasm was unbounded, and he later exclaimed in his first letter to that famous man:

"When I came to New York, I immediately enquired for Coldenhamia, the seat of that most eminent botanist, Mr. Colden. Here, by good fortune, I first met with John Bartram, returning from the Blue Mountains, as they are called. How grateful was such a meeting to me, and how unusual in this part of the

Among the many specimens collected by Garden and sent to Linnaeus for identification was the silver-bell tree, *Halesia carolina*, as the great Swedish botanist named it.

world! What congratulations and salutations passed between us! How happy should I be to pass my life with men so distinguished by genius, acuteness, and liberality, as well as by eminent botanical learning and experience!—men in whom the greatest knowledge and skill are united to the most amiable candour."

Before his return to Carolina, Garden went on a collecting trip to the nearby Appalachians and became acquainted with the flora of that area. Going south from New York, he stopped in Philadelphia to visit again with Bartram. Here he also met Benjamin Franklin, whom he described as a "very ingenious man, especially in electricity." With many botanizing sidetrips, it was the last of December, 1754, before Garden arrived back in Charleston. Here he settled in partnership with another doctor, and for the next two and one-half months was too busy to think of his hobby.

Due, no doubt, to the natural reticence of the amateur, it was not until March 15, 1755, that Garden wrote his first letter to Linnaeus. As was the custom of his day, Garden wrote in Latin, although he knew that Linnaeus could read English. In this letter, Garden lavishly praised Linnaeus' work, particularly his elucidation of the sexual system of plants. Garden told briefly of his own work in the South and offered to make collections of plants for Linnaeus to study. For some reason, Linnaeus failed to respond to this letter. Perhaps this was because of the unreliability of the mail service of that time.

Three years later, Garden sent his second letter. This began a long and profitable correspondence between the two men. In return for the many plants and animals that Garden was able to send him, Linnaeus offered constant encouragement and help.

Shortly after his arrival in Charleston, Garden began his correspondence with Ellis, the English naturalist. Ellis was also a correspondent of Linnaeus, and through these two men Garden received invaluable aid in his work.

Shortly after writing the first letter to Linnaeus, Garden was invited to take a trip with Governor Glen through the Indian country. On this trip, Garden collected many specimens of plants and animals; in addition he discovered an earth that was proved valuable in making the better grades of porcelain.

Quantities of plants, seeds, shells, insects, and every other collectable item went steadily from Garden to Ellis and Linnaeus. Upon the advice of Linnaeus, Garden started gathering fishes and reptiles, collecting them himself, hiring the Negroes, or getting them from the fishermen. His observations even included extensive notes on Halley's comet, which appeared in 1759.

Being both a good naturalist and a good doctor, Garden could not complain much when his duties as a physician kept him from his true love, botany. During the year 1760 there was a smallpox epidemic of great proportions. Garden was intensely interested in methods of controlling this epidemic and did some experimentation with inoculation. For this he used a combination of mercury and antimony.

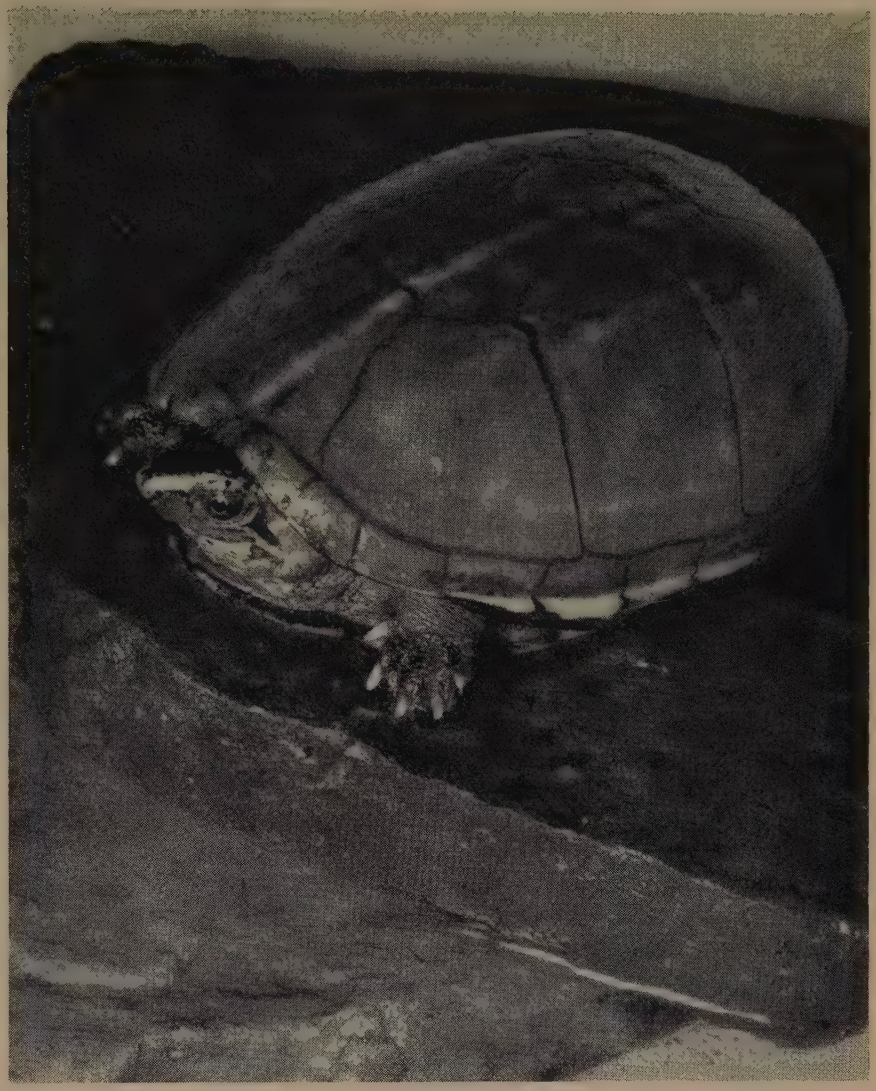
At this time he was so busy that he had scarcely a moment to devote to his botanical studies. He wrote in an apologetic letter to Ellis in April that if Ellis "knew how I am driven about just now, both day and night after the sick, you would laugh at my thinking of Natural History." John Bartram came at this time to spend a few days with Garden, and Garden speaks regretfully of his having so little time to spend with his friend. However, he did take a few hours to show Bartram the woods around Charleston, and Bartram was "almost ravished of his senses and lost in astonishment." Most of the herbs were new to him, and the presence of so many evergreens was astonishing.

Of the many interesting animals that Garden first brought to the attention of European scientists, one was *Siren*, the two-legged amphibian. Linnaeus thought that these specimens represented larval forms; but Garden dissected one, and pointed out that he was fairly certain that (Continued on page 552)

Thirty Years in a Bowl

By EDWIN WAY TEALE

Photographs by the Author



The Lady, a striped mud turtle from Florida, brought north by William T. Davis in 1913.

AMONG the turtles of my acquaintance, the most remarkable is named The Lady. For more than thirty years she has lived in a white world less than three feet in diameter—a porcelain bowl set close to a basement window on Staten Island, in New York Bay. Sunning herself on the tiny Crusoe's Island of a rock rising above the water in the bowl, The Lady is mistress of all she surveys. The whole round world within the horizon-rim of the porcelain bowl is hers. Innumerable times she has circled it or crisscrossed from horizon to horizon. Her life, for more than three decades, has been peaceful, simple, almost unvaried.

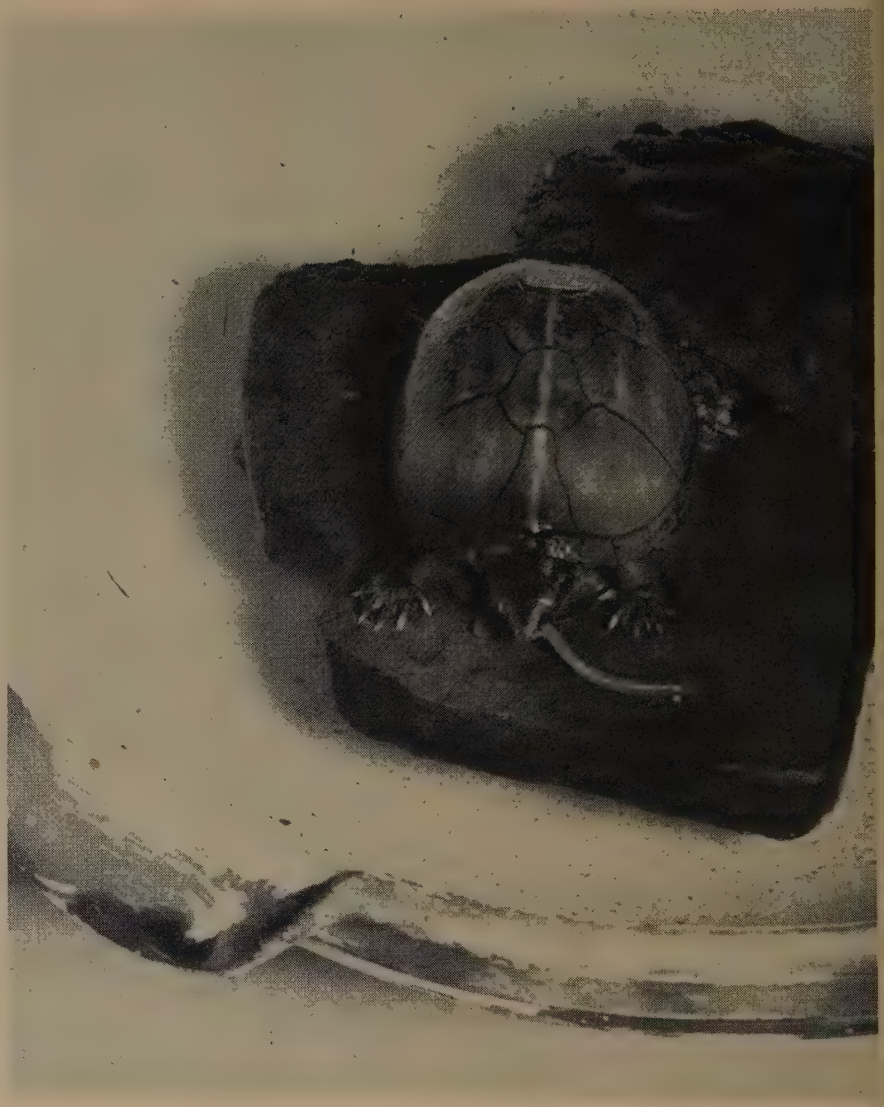
September 7, 1913, is probably the most dramatic date in her life. Born near the mouth of the St. Johns River, in northern Florida, she was already full grown on that early-September day. Paddling about, she came within reach of a visiting naturalist from the north, the famous cicada expert, William T. Davis of Staten Island. A few days later, she was riding north to become the favored pet of this kindly man throughout the rest of his life.

The large porcelain bowl, which had been inherited from a relative who operated a chemical plant, was established by the basement window as a home for the turtle. Her owner named her The Lady, and, in later years, he referred to his basement as The Turtle Floor. He looked up The Lady's family and found she belonged to an exclusive clan, the species *Kinosternon baurii*, which is found only in peninsular Florida. Popularly, this species is known as the Florida striped mud turtle. It is distinguished by a pair of yellow stripes running back along either side of the head and three stripes of the same color extending lengthwise along the top of the shell. In the case of The Lady, the stripes are so dull they are almost invisible.

The first time I visited William T. Davis, he took me down to The Turtle Floor to introduce me to The Lady. As soon as he called "Hello there!" the turtle poked her head out and paddled up to the edge of the bowl. She had learned to associate his appearance with food. His call was a kind of dinner bell. Daintily she took bits of raw meat from between his fingers. While she ate, he scratched the top of her head. A special delicacy that she always enjoyed was a fresh angleworm. When she had swallowed the last of the bits of meat, The Lady paddled back to her little island and resumed her contented dozing.

Only a small handful of a turtle, about three and a half inches long and two and a half inches wide, she is of special interest to scientists. Her uneventful life in a bowl has given them their first check on the longevity of this species. Her photograph, and a short account of her years on Staten Island, appear in Clifford Pope's standard work on the *Turtles of the United States and Canada.*

Among The Lady's relatives in the *Kinosternon* clan there are such varied species as the Sonoran mud turtle, which lives at elevations as high as 5000 feet



Fresh angleworms are a delicacy The Lady relishes. Her usual fare is bits of raw meat supplemented by various insects that drop into the water.

above sea level, and that polecat of the turtle world, the yellow mud turtle of Nebraska, Oklahoma, Kansas and Texas. Its descriptive common name is the Stink Pot. The vile odor it gives off provides it with protection just as does the odor of the skunk. Both the Mississippi mud turtle and the Sonoran mud turtle will migrate long distances to find water-holes during periods of drought. A curious characteristic of all the *Kinosternon* mud turtles is the patch of horny scales that are located on the inside of the hind legs of the males. For a long time, it was thought that these patches were rubbed together, something in the manner of the wings of a cricket, to produce a sound by stridulation. No one ever heard this turtle music. Now, the theory has been discarded. Scientists believe that the patches serve another purpose, that of aiding the male in getting a better grip on the shell of the female at mating time.

In their Florida homeland, the striped mud turtles thrive in brackish water along the coast. It is this characteristic that enables them to live even on the keys off the far southern tip of the peninsula. Ever since The Lady traveled north from Jacksonville, however, she has been living in clean, fresh water far different from that of the muddy stream that was her original home. The change has produced no ill effects. In her porcelain bowl, she has found herself free from predators and parasites. The leeches that so often prey on mud turtles in the sediment-filled water of swamps and ponds are unknown to her. Here, while more than thirty calendars have become obsolete, she has thrived.

As is the way with turtles, a good part of her time has been spent in dozing. This is especially true during winter months. Just what proportion of her thirty and more years in a bowl has been consumed by slumber no one knows. But it is certainly sufficient to recall the mild bewilderment of Gilbert White, the seventeenth-century naturalist, when he considered, as he did many things in nature, the life of the turtle.

"When one reflects on the state of this strange being," White writes in *The Natural History of Selborne*, "it is a matter of wonder to find that Providence should bestow such a profusion of days, such a seeming waste of longevity, on a reptile that appears to relish it so little as to squander more than two-thirds of its existence in joyless stupor, and to be lost to all sensation for months together in the profoundest of slumbers."

After the death of William T. Davis, in the winter of 1944, The Lady was moved, bowl and all, to the Staten Island Museum, at St. George. Here she spends her hours much as before. She feeds sparsely on insects, bits of meat and angleworms. She suns herself on the rocks that form her island. She paddles about her circular little world when the mood strikes her. Thus her strange life in a bowl continues, a life that is contributing new knowledge about the "profusion of days" with which Nature has endowed her kind.

★

Chick, Chick

By E. LAURENCE PALMER

This is the forty-seventh in Nature Magazine's series of educational inserts.

RHODE ISLAND RED

BARRED PLYMOUTH ROCK

SILVER WYANDOTTE

BUFF ORPINGTON

SINCE philosophers, from time immemorial, have debated which came first, the chicken or the egg, it is difficult to know just where to begin a discussion of an animal that has been so long identified with the economics, health, folklore, history, literature, and even politics of the human race. Probably, no other bird has been so closely tied to man's interests as has the common domestic fowl, and that does not necessarily imply that a man is hen-pecked.

Even our language has been affected by our association with chickens. A woman may blush with pleased embarrassment if she is alluded to as a "chicken," even though she may show outward resentment. On the other hand, no woman enjoys being called an old hen. When a youngster is thoroughly disgusted with someone, he may yell, "Aw, go lay an egg," but to what he refers in that request is difficult to understand. Our roadside punsters do not neglect the chicken and all too frequently advertise an eating place as a "Chick Inn," and probably the most abused of all stale jokes of minstrel show vintage refers to the question as to why a chicken crosses the road.

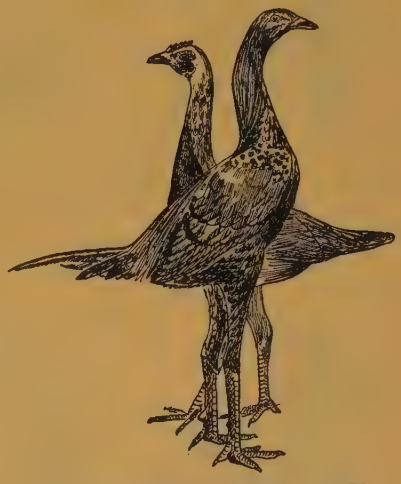
Shakespeare must have enjoyed hearing roosters crow. In *Hamlet,* he speaks of "the cock that is the trumpet of the morn"; in *The Tempest,* it is "Hark! Hark! I hear the strain of strutting Chanticleer," and in *Richard III* he is at his best when he says, "The early village cock hath twice done salutation to the morn." The mere reading of such excellent use of this animal in descriptive English should induce the writer to stop here and now and attempt no more. Shakespeare had what no modern writer can even pretend to have.

The crowing of cocks is frequently referred to in common sayings, such as "Every cock can crow (or fight) on his own dung-hill." "As the old cock crows, the young one learns." "Cock-crow at evening indicates rain." "The cock who thought the sun rose to hear him crow."

Milton, in *L'Allegro,* approaches Shakespeare when he writes: "While the cock with lively din scatters the rear of darkness thin."

In Biblical times, the third watch, or the time

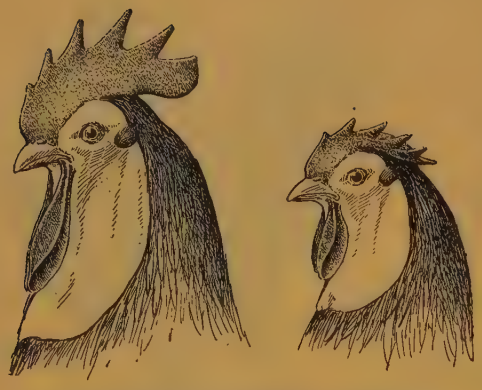
BLACK LANGSHAN



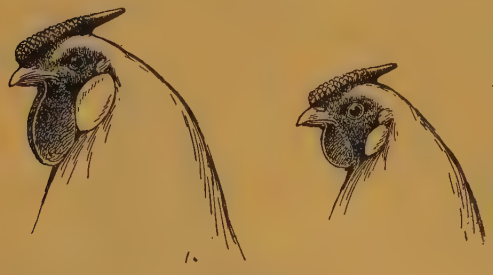
BLACK-BREASTED RED GAME

SINGLE-COMB ANCONA

SINGLE-COMB WHITE LEGHORN

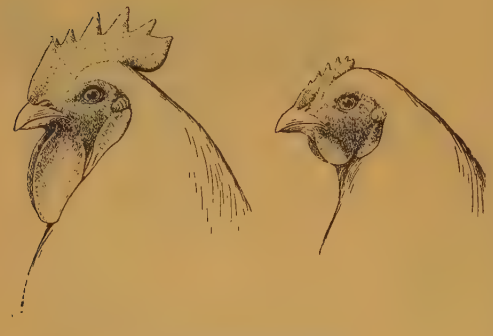


WHITE-FACED BLACK SPANISH

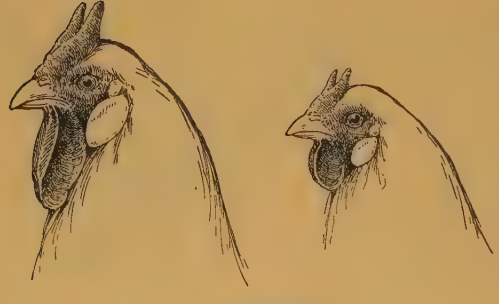


HAMBURG

ROSE-COMB WHITE LEGHORN



PLYMOUTH ROCK



LA FLECHE

from midnight to morn, was spoken of as the "cock-crowing watch." To some of us who in recent years have lived in suburban centers, this has only a nostalgic meaning, but how appropriate it was to associate that part of the day with a sound so closely identified with it. In Mark, 14:35, we read, "for ye know not when the master of the house cometh, at even, or at midnight, or at the cockcrowing, or in the morning," and if one wished to be facetious in interpretating this he might have some fun.

The *Bible* also uses the hen as an object lesson in Matthew 24:37. There we read, "how often would I have gathered thy children together as a hen gathereth her chickens."

The hen also figures in many sayings that have survived down through the years. Among these are: "A bad hen, a bad egg"; "It's a sad house where the hen crows loudest"; "He that is born of a hen must scrape for a living"; "A hen tomorrow better than an egg today"; and "If the hen moult before the cock, hard weather." Another refers to the well-known fact that "one chick keeps the hen busy," and if anyone thinks that puns are modern afflictions he should remember the saying that he was a "chick of the old cock," which dates from 1678.

We could write this whole article on sayings of this sort, but there is too much else of interest. For example, the emblem of France is a crowing cock; one of the planks in a certain presidential campaign in America included a promise to have "a chicken in every pot." We should remember that, at Easter time, eggs and, unfortunately, little chicks, play an important part, and there are those with faith in the suggestion that there is a close tie-up between Easter bunnies and Easter eggs. A few years ago we received a letter asking that the College of Agriculture send some rabbit eggs for hatching by Easter time.

In our more practical world, the chicken plays a most important part. A surprising number of veterans have expressed the hope that, when peace came, they could retire to a chicken farm, although it is doubtful if they could have gained enthusiasm for the project by reading that best seller, *The Egg and I.* Many city persons, bored with their existence, feel that if they only had a chicken farm everything would be fine, and the chickens could do all the work. What a surprise many of these have in store for them. Chickens do not grow in stature and in egg-production ability without help. While the price now brought by eggs and poultry is high, the cost of feeding and rearing the animals has increased correspondingly.

Human logic, as applied to the food value of poultry products, is sometimes hard to follow. A missionary friend once told me of the difficulty he had in improving the diet of those with whom he was working in southern Asia. They had religious scruples against eating animals, and, since eggs normally could be expected to hatch into chickens, eggs could not be eaten without violating the rule. He got around this by keeping the roosters apart from the hens. This meant, of course, that the eggs were not fertile. Since they were not fertile, they could not develop into animals. Since they could not be considered as potential animals, there was of course no reason why they could not be eaten, and thus the diet could be improved without conflicting with religious edicts.

Medical science has, in recent years, found a new and valuable use for poultry. It has been found that hens' eggs may be used as a substitute for adult animals. This shortens the time and lessens the expense of such medical researches. When you complain about the high cost of eggs, remember that, in 1939 alone, one of these projects directed towards maintaining your health used more than a million eggs, and since that time the use of eggs in this general field has increased tremendously.

Eggs are used not only to develop different serums, formerly developed in mature animals, but to test the germicidal qualities of certain substances. In some ways, eggs are superior to adult animals for these medical studies, not only because they are cheaper but because they represent a more standard unit

with which to work. The adult animal, no matter how healthy, must have other organisms associated with it, and these affect it in some way. An egg is essentially a sterile unit. Among the diseases that have been studied and are being fought through the use of eggs, the better known are measles, chicken-pox and smallpox.

Dr. Alexis Romanoff has prepared a table showing some of the important steps that take place in the development of an ordinary fertilized hen's egg when it is kept at the proper incubation temperature. In substance, it is as follows:

While the egg is still in the hen, fertilization, some division of growth of living cells, and some segregation of cells into groups with similar function take place. After the egg is laid, and before incubation begins, there is no growth and the embryonic life is essentially inactive.

During incubation, the time table of development runs something like this.

First day: 16 hours—first sign of resemblance to chick embryo; 18 hours—appearance of alimentary tract; 20 hours—appearance of vertebral column; 21 hours—beginning of formation of nervous system; 23 hours—first appearance of blood vessels; 24 hours—beginning of formation of eye.

Second day: 25 hours—beginning of formation of heart; 35 hours—beginning of formation of ear; 42 hours—heart begins to beat.

Third day: 50 hours—beginning of formation of amnion or embryo sac; 60 hours—beginning of formation of nose; 62 hours—beginning of formation of legs; 64 hours—beginning of formation of wings; 70 hours—beginning of formation of allantois (respiratory).

Fourth day—beginning of formation of tongue; *Fifth day*—beginning of formation of reproductive organs and sex differentiation; *Sixth day*—beginning of formation of beak and egg-tooth; *Eighth day*—beginning of formation of feathers; *Tenth day*—beginning of hardening of the beak; *Thirteenth day*—beginning of appearance of scales and claws; *Fourteenth day*—embryo turns head towards blunt end of egg; *Sixteenth day*—scales, claws and beak become horny; *Seventeenth day*—beak turns towards air cell in egg; *Nineteenth day*—yolk sac begins to enter body cavity; *Twentieth day*—yolk sac completely in body cavity and embryo practically fills the egg; *Twenty-first day*—chick hatches.

When the chick hatches, approximately one-sixth of its weight is a reserve food supply. This means that, for a day or so, the chick does not need to eat. During this period it may be shipped safely by rail, or by air. If the chick is fortunate it finds itself, at the end of that time, in a permanent home where it can find the food and shelter it needs. It may land on a counter in a dime store in a great city, where it may be "loved" by some child as a pet for a few days, but where its chance of survival is practically *nil*. In some places, however, it is illegal to abuse young chicks in this way.

The business of hatching eggs and selling chicks is really big business. While still in a highly experimental stage, breeding of hybrid chickens is being investigated and improved in a number of important centers. Essentially, this consists of repeated inbreeding of poultry that have certain desired qualities, such as rapid maturity, high egg production, high hatchability and some disease resistance. This inbreeding eventually greatly reduces such qualities as high hatchability, for example. But when individuals that have been highly inbred are crossed with other individuals that also may have been highly inbred, the offspring of the cross may have highly superior qualities. If these crosses are, in turn, bred with similar crosses, we have a double cross that may be phenomenally superior. Unfortunately, as in corn, these superior qualities are not retained permanently in succeeding generations. So, while the generation that is finally selected may have outstanding values, the cost of its production may offset its immediate values. When working with animals that need food as do chickens, the cost of developing the desired individuals may be much in excess of the costs involved in developing corn, which gets its food more independently from the (*Continued on last page of insert*)

BRAHMA

SINGLE-COMB WHITE LEGHORN

SINGLE-COMB BLACK MINORCA

CREVECOEUR

HOUDAN

	AMERICAN BREEDS OF POULTRY			FRENCH BREEDS
CLASS	In this Class are the Plymouth Rocks, Rhode Island Reds, Javas, Dominiques and Buckeyes			(See next two columns)
BREEDS AND VARIETIES	Plymouth Rocks include as varieties: Barred, White, Buff, Silver-pencilled, Partridge and Columbian.	Rhode Island Reds include as varieties: the Single-combed and the Rose-combed	Wyandottes varieties: Buff, White, Partridge, Silver Pencilled, Golden-laced Columbian	Houdans include two varieties, the white and the mottled
COCK	(Barred) Weight: 9½ pounds. Gray and whitish barred. Head: moderate. Face: smooth. Comb: single, upright, evenly serrate, bright red, with 5 small points. Beak: short, stout, regularly curved. Eye: full, prominent, reddish. Wattles: moderately large, rounded below, conspicuously red. Ear-lobe: oblong, ½ length of wattle, red. Feathers: medium close, dark and light parallel bars. Neck: long, moderately arched, with abundant hackle. Breast: deep, full, well rounded. Back: long, broad, concave to tail. Sickle: well curved, medium. Wings: medium, well folded, front hidden by breast feathers. Tail: medium length, held at 30° angle. Shanks: smooth, stout, medium length, yellow. Toes: straight, stout, yellow.	(Single Comb) Weight: 8½ pounds. Rich red, somewhat darker above. Head: medium, horizontal. Face: smooth. Comb: medium, upright, oblong, bright red, spiked to the rear: Beak. medium, reddish, slightly curved. Eye: reddish. Wattles: equal, no folds or wrinkles, medium-sized, red. Ear-lobe: oblong, smooth, equal, red. Feathers: rather close to body, a rich red for most part. Neck: medium, with abundant hackle. Breast: deep, full, well rounded. Back: long, broad, horizontal. Sickle: medium length, abundant. Wings: good sized, well folded, held in a horizontal position. Tail: medium length, full, held at 40° angle. Shanks: smooth, medium length, yellow. Toes: straight, stout, rich yellow.	(Silver-pencilled) Weight: 8½ pounds. Black, with white lacings in Silver-pencilled. Head: short and round. Face: smooth, featherless. Comb: low, tapered to a point at the rear, rose colored. Beak: short, dark to yellow, regularly curved. Eye: oval, red. Wattles: moderately long, bright red. Ear-lobe: oblong, ⅓ length of wattle, red. Feathers: usually black with silvery white lacings or white in spots. Neck: short, well-arched, with abundant hackle. Breast: deep, full, well rounded. Back: moderately short, rising to tail base. Sickle: moderately long. Wings: bows, silvery, coverts white with green-black lacings. Tail: black, full, medium length, angle of 45°. Shanks: smooth, straight, yellow. Toes: straight, stout, rich yellow.	(Mottled) Weight: 7½ pounds. Glossy black, with white-tipped feathers. Head: medium with a full round crest. Face: small, triangular, broadest forward. Comb: small, V-shaped with rear crowded against front of crest, red. Beak: moderate and well curved. Eye: large, full, red. Wattles: well rounded, small, bright red. Ear-lobe: concealed by crest and beard. Feathers: conspicuous crest of feathers makes crown, otherwise close. Neck: medium arched with abundant shoulder hackles. Breast: full, deep, well rounded. Back: long, broad, sloping concavely to tail base. Sickle: abundant and conspicuous, curved. Wings: moderately large, well folded, with elbow hidden in breast feathers. Tail: fully expanded and held at 40° angle. Shanks: medium, from large thighs. Toes: 5, pink white to black mottled.
HEN	Weight: 7½ pounds. Smaller, with much smaller comb, wattles and ear-lobe, shorter tail held at angle of 20° and shorter neck.	Weight: 6½ pounds. Smaller, with much shorter comb and wattles, with shorter neck hackles and sickles, with shorter tail and neck.	Weight: 6½ pounds Smaller, with much shorter comb and wattles, few hackles and shorter sickles or none, with shorter neck.	Weight: 6½ pounds Much like cock but smaller in general, with head feathers shorter, tail much shorter and sickles mostly lacking or short.
COCKEREL	Weight: 8 pounds.	Weight: 7½ pounds.	Weight: 7½ pounds.	Weight: 6½ pounds.
PULLET	Weight: 6 pounds.	Weight: 5 pounds.	Weight: 5½ pounds.	Weight: 5½ pounds.
HISTORY	Barred was first variety developed. May have been evolved from Dominique breed with 3 distinct strains: the Drake, (Stoughton, Mass., 1866); the Sussex County, (Mass., 1856); and the Upham, (Connecticut, 1865).	Breed originated in Rhode Island early in the 19th century and in heritage are Red Malay Game, Brown Leghorn and others.	Established as breed about 1860. Buff produced by crossing White Wyandottes with Buff Cochins. Silver-pencilled through crosses of Dark Brahma, Partridge Wyandotte and Silver-pencilled Hamburg.	One of the oldest of the French breeds resembling in size and shape the related Dorkings. Not too popular in America and not commonly seen on most chicken farms.
USE	Raised for meat and eggs. Eggs: large and brown.	General purpose breed being raised for meat and eggs. Eggs: large, brown.	Good general purpose fowls raised for meat and eggs. Eggs: brown, medium sized.	Raised primarily for their flesh, which is abundant and of high quality.
GENERAL INFORMATION (Read across next page)	Management for flesh production calls for selection of quick maturing strains. Most breeds weigh about 1 pound at 2 months; 2 pounds at 3 months. If prospective broilers are fed mash first 8 weeks they will be marketable sooner. Cockerels considered desirable for breeders should be selected at broiler age, about 3 times as many as will be needed (3 to 15 hens) being saved for further selection of 1 to 15 hens. For the broilers, feed mash twice daily after 2 days old and after 10 weeks, make it available at all times. Beginning at 4 weeks, scratch grain is added so that until 3 months old, grain and mash are eaten equally. See following pages for other matters of general nature.			

FRENCH BREEDS OF POULTRY		ASIATIC BREEDS OF POULTRY		
In the French class are four breeds, the Houdans, Crevecoeurs, the La Fleches and the Faverolles		Asiatic Breeds include the Brahmas, Cochins, and Langshans developed for flesh, and the smaller Malay, Aseel and Black Sumatra		
Crevecoeurs include but one variety, the Black	La Fleche has but one variety, the Black	Brahmas include the two varieties, Light and Dark, of which the Light is usually the heavier.	Cochins include the following varieties: Buff, White, Black and Partridge.	Langshans include the two varieties, the Black and the White, of which the Black is the more common.
(Black) Weight: 8 pounds. Glossy black, solid, without white tips. Head: medium, with protuberance on top of skull. Face: small, with feathers crowding above and below. Comb: medium, V-shaped, with back against crown, red. Beak: strong, black to horn color, well curved. Eye: full, oval, bright red. Wattles: uniform length, small, well rounded, red. Ear-lobe: small and nearly concealed by crest. Feathers: conspicuous crest of feathers, otherwise close. Neck: medium arched, with large shoulder hackles. Breast: full, rounded to shoulder. Back: broad, straight, with abundant saddle feathers. Sickle: abundant and conspicuous. Wings: medium, well folded. Tail: fully expanded, held at 45° angle. Shanks: short, firm, black to lead-colored, spread. Toes: 4, straight, spread.	(Black) Weight: 8½ pounds. Rich, glossy black, with red flesh behind nostril. Head: medium. Face: more normal than in other French breeds. Comb: medium to small, bright red, with twin spike. Beak: long, strong, black-horn colored, well curved. Eye: large, red. Wattles: equal, long, pendulous, well rounded, bright red. Ear-lobe: large, white, rather conspicuous. Feathers: close, solid black, without crest of other French breeds. Neck: long, erect, with abundant hackles. Breast: broad, full and prominent. Back: broad, long and sloping to tail base. Sickle: abundant. Wings: long, strong and well-folded. Tail: long, full and held at 40° angle. Shanks: long, medium coarse, black to slate. Toes: straight, spread, black to slate.	(Light) Weight: 12 pounds. Light Brahma hackle and saddle: black, white tips. Head: medium to broad, with crown over eyes. Face: small. Comb: small, slightly serrated in three rows, bright red. Beak: long, strong, black-horn, strongly curved. Eye: deep-set, large, red. Wattles: to just below the ear-lobe, medium in width, bright red. Ear-lobe: large, bright red, smooth. Feathers: compact giving bird a solid appearance, uniformly white-edged. Neck: long, erect and with abundant hackle. Breast: deep, broad and well rounded. Back: broad, flat, with a middle saddle. Sickle: long, greenish with white border. Wings: small, high and held horizontally. Tail: well spread, large, full, held at 33° angle. Shanks: stout, large, with feathers on outside. Toes: straight, stout and feathered.	(Buff) Weight: 11 pounds. Golden buff, richer possibly above. Head: short, broad, prominent over eyes. Face: finely textured, mild. Comb: medium, single, bright red, with 5 conspicuous points, erect. Beak: short, stout, somewhat curved, yellow. Eye: medium in size and shape, reddish bay. Wattles: long, rounded, thin at lower edges, bright red. Ear-lobe: smooth and bright red. Feathers: fluffy for most part: Neck: arched, short, with abundant hackle. Breast: low, deep, broad and well rounded. Back: short, flat, with abundant plumage. Sickle: abundant, short, curved. Wings: small and well folded, horizontal. Tail: short, well-spread, bulky at 45° angle. Shanks: short, heavily feathered, yellow. Toes: straight, feathered, richly yellow.	(Black) Weight: 9½ pounds. Plain black, with a greenish luster. Head: medium, with some breadth. Face: normal, smooth. Comb: erect to medium upright, single, red, with 5 points. Beak: stout at base, well curved, dark horn-color. Eye: large, round, reddish to bay. Wattles: moderate in size and shape, rounded, equal, red. Ear-lobe: oblong, well developed, red. Feathers: medium loose, uniformly black, some sickles to 17 inches long, curved. Medium well arched, with abundant hackle. Breast: deep, full and well rounded. Back: short, broad, flat at shoulder, saddle to tail. Sickle: abundant, curved, some to 17 inches long. Wings: medium, held close to body horizontally. Tail: large, full, held at 70° angle. Shanks: coarse, strong dark, feathered outside. Toes: straight, strong, dark, feathered but none on middle.
Weight: 7 pounds Much like cock but with smaller, narrower wattles, shorter tail and less conspicuous sickles	Weight: 7½ pounds Much like cock but smaller and with much smaller wattles and shorter less conspicuous tail and sickles.	Weight: 9½ pounds Much like cock but with smaller head, wattles, comb, ear-lobe and tail and with tail held more nearly to the horizontal.	Weight: 9 pounds. Smaller than cock, with much smaller head, wattles, comb and ear-lobe, with little or no sickle feathers and with tail almost inconspicuous.	Weight: 7½ pounds. Smaller than cock, with much smaller comb and wattles, with shorter tail without characteristic long curved sickle feathers of the cock and with shorter hackles.
Weight: 7 pounds.	Weight: 7½ pounds.	Weight to 10 pounds.	Weight: 9 pounds.	Weight: 8 pounds.
Weight: 6 pounds.	Weight: 6½ pounds.	Weight: 8 pounds.	Weight: 7 pounds.	Weight: 6½ pounds.
An old French breed whose name comes from the French village Crevecoeur. Not popular in America where they are considered as fancy fowls though their practical qualities are much higher than in most fancy breeds.	This breed is reputed to have developed from a cross between Crevecoeurs and Spanish breeds. They are more powerful than is necessary in a bird raised for practical purposes.	First developed in India then introduced to China. There improved. First in America in 1846 and to England in 1853. Now locally popular.	Cochin chicken formerly known as Cochin China and as Shanghai chicken obviously originated in China. Introduced into England in 1845 but does not ordinarily retain its popularity long.	Like other Asiatic fowls the Langshans are relatively old as a breed. In America, they are frequently popular.
Not raised commonly in America though are good for flesh particularly.	Not a popular American breed.	Raised for flesh and for eggs, less robust than Cochins. Eggs: large and brown.	Raised primarily as flesh producer but not very popular in that capacity. Eggs: large and brown.	Raised as meat and egg producers with meat excellent and eggs large and white.
GENERAL INFORMATION **(Read across next page)**	In a typical chicken, the life history of the animal is somewhat as follows: A male *rooster* mates with the female *hen* with 1 rooster sometimes considered able to care for 20 hens, though 15 is preferable. Fertile eggs may result from one mating over a period of a month. Fertile eggs are incubated at 103° F. and normally hatch in 21 days into the *chicks*. Chicks need not eat for 48 hours. They roost at 1 month of age. Sexes should be separated at 4 weeks. At 6 weeks, young males may be unsexed to grow up as *capons*. Otherwise, they become *cockerels* and when sexually mature *roosters*. Young females are *pullets* and at 5 to 6 months may begin egg-laying. Individual hen known to lay to 1,000 eggs in lifetime. Non-breeders are often fattened for sale as broilers at 10 to 12 weeks of age. Body temperature: 103° to 108° F. Life span: to 15 years. (*See next page*)				

	ORIENTAL BREEDS	GAME BREEDS OF POULTRY	HAMBURG BREED	ENGLISH BREEDS
CLASS	Oriental Breeds include Malays, Sumatras and Malay Bantams.	Game Breeds include Games and Game Bantams.	Hamburgs are in a Class by themselves.	Orpingtons, Cornish, Sussex, Redcaps and Dorkings are in this Class.
BREEDS AND VARIETIES	Orientals include Black Sumatras, Black-breasted Malays and Black-breasted Red Malay Bantams, sometimes considered Asiatic.	Game varieties include Black-breasted Red, Golden Duckwing, Silver Duckwing, Birchen, Red Pyle, White and Black.	Hamburgs include in the one breed the varieties: Black, White, Silver-pencilled, Golden-pencilled, Silver-spangled, Golden-spangled.	Orpington varieties include Buff, Black, White and Blue.
COCK	(Malay) Weight: 9 pounds. Black-breasted red as name implies. Head: relatively small and long. Face: small and elongate, fierce looking. Comb: small, strawberry-like, rose, thin, set forward. Beak: thick, short, strong. Eye: large, pearly or yellowish. Wattles: small and relatively inconspicuous, red. Ear-lobe: narrow, small and light. Feathers: close and compact, defining shape of body well. Neck: long, straight, erect, relatively slender. Breast: prominent, full, broad but held high. Back: long, slanting, narrow, glossy black. Sickle: scanty but well curved, greenish black. Wings: short, stout, held tightly to sides of body, black and red. Tail: medium, when folded drooping below horizontal. Shanks: long, hard, round, yellow. Toes: flat, broadly spread, yellow.	(Black-breasted Red) Weight: 8 pounds. Black-breasted red as name implies. Head: relatively small and narrow. Face: small, elongate, fierce looking. Comb: low, erect, straight, red. Beak: medium, slender, curved. Eye: large, keen and piercing, red. Wattles: neat, smooth, small and red. Ear-lobe: small, inconspicuous, red. Feathers: close and compact, colored as indicated. Neck: long, curving, with scanty hackle. Breast: high, narrow, black. Back: bright red with golden yellow saddle, short. Sickle: lustrous black. Wings: large, powerful, compact; when folded, ends not beyond body. Tail: stout, closely folded, held horizontally. Shanks: long, straight, willow green. Toes: long, straight, willow green.	(Silver-spangled) Weight: under 5 pounds. Slate-colored, barred with silver, with greenish black. Head: medium in size and white. Face: well defined in color by ear-lobe and crown. Comb: medium erect, with many bright red erect but low protuberances. Beak: medium, dark brown, well curved. Eye: large, mild, reddish bay. Wattles: thin, medium, well rounded and usually bright red. Ear-lobe: large, flat, round, white. Feathers: as indicated by variety, close and compact. Neck: tapering, white, with spangled feathers. Breast: silvery white with black spangle on each feather. Back: medium, silvery white with black spangles. Sickle: long, well curved, white with black end. Wings: medium, carried low, with white bows spangled with black, appear barred. Tail: long, black and white, held at 45° angle. Shanks and toes: lead-blue.	(Buff) Weight: 10 pounds. Rich golden buff throughout. Head: medium length, deep, broad. Face: average, round. Comb: medium erect, with 5 points, bright red, straight, fine, well set. Beak: short, straight, pinkish white, curved. Eye: large, round, reddish bay. Wattles: well rounded, long, medium texture, bright red. Ear-lobe: medium to oblong, bright red. Feathers: uniform buff, relatively loose. Neck: short, well arched, with abundant hackles. Breast: deep, full, well rounded, normal. Back: broad, well feathered, medium length. Sickle: medium length and abundant. Wings: medium to small, well folded and partly hidden by sickles. Tail: moderately long, carried at 45° angle. Shanks: stout, relatively short, pinkish white. Toes: medium in length, pinkish white.
HEN	Weight: to 7 pounds. Smaller than cock, with smaller comb, wattles, tail and body.	Weight: Smaller than cock, with possibly larger comb but shorter, straighter tail, smaller eyes and shorter hackle feathers.	Weight: well under 5 pounds. Smaller than cock, with smaller head, comb, wattles, ear-lobe and tail without long curved sickles but with the straight feathers. Hackles shorter and finer.	Weight: 7½ pounds. Smaller than cock, with much smaller comb, shorter wattles and shorter tail, with few if any hackles or sickles.
COCKEREL	Weight: 7 pounds.	Weight: 7 pounds.	Weight: under 4 pounds.	Weight: 8½ pounds.
PULLET	Weight: about 5 pounds.	Weight: about 5 pounds.	Weight: under 3 pounds.	Weight: 7 pounds.
HISTORY	Malays were originated in India but perfected and developed in Java and Sumatra. Hardy and tough. Formerly more popular as fighting birds.	Games have been developed in various parts of the world for competitive fighting. Bantam forms are popular as pets and as fancy birds. In British class, the Cornish supplied the game birds but were later bred as good meat producers.	Supposedly developed in Dutch Friesland (Pencilled); in Italy (Spangled) and elsewhere in western Europe. Imported into England from Holland and Belgium in 1825.	Orpington first developed was the Black originating about 1886 involving Plymouth Rock, Black Langshan and Black Minorca. Buff developed from Buff Cochin, Dark Dorking and Golden Spangled Hamburg.
USE	Malays have been raised as fighters.	Games are raised as meat producers and as fighters.	Raised as ornamentals for show. Sicilian Buttercup breed from Italy in 1860. Eggs: small and white.	Developed for egg-laying and meat production. Eggs: large and brown.
GENERAL INFORMATION (Read across next page)	One thousand pounds of living chickens require 8,278 cubic feet of fresh air for breathing each day. Feeding chickens for different purposes has become an art, with special rations for special purposes. A good mash mixture may include 40 pounds of yellow corn meal, 10 pounds of wheat bran, 20 pounds of flour wheat middlings, 10 pounds of fine-ground heavy oats, ½ pound of salt, 10 pounds of ground meat scrap, 2 pounds of pulverized limestone, ½ pound of natural cod-liver oil. A good mixture for 4 weeks to maturity is equal parts of cracked corn and whole wheat. See other columns in this section for other general facts applicable to these breeds. (*See next page*)			

MEDITERRANEAN BREEDS OF POULTRY

Mediterranean Breeds include the Leghorns, Minorcas, Spanish, Blue Andalusians and Anconas

Leghorns include 9 varieties, with single-comb and rose-comb Browns, Whites and Buffs, a single-comb Black, a Silver and a Red Pyle.		Minorcas include Single-comb and Rose-comb Whites and Blacks and Single-comb Buffs.	Spanish include the one variety, White-faced Black Spanish.	Anconas include two varieties, the Single-comb and the Rose-comb.
(Single-comb White) Weight: 5½ pounds. Pure white throughout. Head: long and medium deep. Face: nearly round. Comb: medium, erect at least in front, single, with 5 distinct points. Beak: not long, curved, yellow. Eye: medium, nearly round, reddish bay. Wattles: moderate, even, thin, well rounded, bright red. Ear-lobe: oval, smooth, thin, white. Feathers: white, firm, closely crowded, making appearance of compactness. Neck: long, slender, gracefully arched, well hackled. Breast: deep, full, rounded, forward trust. Back: broad, sloping down to rise to tail. Sickle: well developed and abundant. Wings: large, strong, well folded and capable of good flight. Tail: full, well spread, carried at 45° angle. Shanks: long, slender, strong, yellow. Toes: long, slender, straight, yellow.	(Rose-comb White) Weight: 5½ pounds. Pure white throughout. Head: long and medium deep. Face: nearly round. Comb: small, square in front, tapering to horizontal spike, rose colored. Beak: not long, curved, yellow. Eye: medium, nearly round, reddish bay. Wattles: moderate, even, thin, well rounded, bright red. Ear-lobe: oval, smooth, thin, white. Feathers: white, closely compacted to body, firm. Neck: long, gracefully arched, slender, well hackled. Breast: deep, full, rounded, thrust forward. Back: broad, sloping down to rise to tail. Sickle: well developed and abundant. Wings: large, strong and well folded, capable of flight. Tail: full, well spread, carried at 45° angle. Shanks: long, slender, strong, yellow. Toes: long, slender, straight, yellow.	(Single-comb Black) Weight: 9 pounds. Lustrous greenish black. Head: medium long, wide and deep. Face: nearly round. Comb: single, medium, erect at least in front, 6 distinct points. Beak: stout, good length, curved. Eye: large, dark brown. Wattles: long, thin, without folds, well rounded, bright red. Ear-lobe: large, thin, smooth and white. Feathers: close and greenish black with a gloss. Neck: long, arching, with abundant hackle. Breast: deep, full, prominent, rounded. Back: long, flat and sloping down to the rear. Sickle: long and well curved. Wings: large, full and well folded, carried close to body. Tail: large, full, carried at 40° angle. Shanks: long, thin, strong; black to slate colored. Toes: straight, black to slate colored.	(White-faced Black) Weight: 8 pounds. Rich, glossy black. Head: broad and deep. Face: long, pendulous, white. Comb: single, straight, firm, deeply, evenly serrate, 5 points. Beak: long and stout, curved. Eye: large, oval, dark brown. Wattles: smooth, long, thin, ribbon-like, bright red. Ear-lobe: large, no folds, smooth, white. Feathers: close, a rich glossy black throughout. Neck: well arched, with abundant hackle. Breast: deep, well rounded, prominent. Back: long straight, sloping to saddle and up to tail. Sickle: abundant, long and well curved. Wings: large, well folded tips hidden under sickles. Tail: large, full, carried at 45° angle. Shanks: long, strong, black to lead-blue. Toes: straight, strong, lead-blue to black.	(Single-comb) Weight: 5½ pounds. Mottled black, with some feathers white-tipped. Head: moderately long and fairly deep. Face: nearly round. Comb: single, deeply serrate, bright red, with 5 points. Beak: not long, yellow but dark shaded above. Eye: medium, round, reddish bay. Wattles: long, thin, smooth, well rounded, bright red. Ear-lobes: medium, almond shaped, white. Feathers: close, black with about 1 in every 3 white-tipped. Neck: long, well arched, with abundant hackle. Breast: well rounded and held forward. Back: rounded at shoulders, sloping to rear up to tail. Sickle: abundant, long and well curved. Wings: large, well folded, carried close to body. Tail: large, well spread, carried at 45° angle. Shanks: straight, yellow or yellow mottled with black. Toes: straight, yellow or yellow and black.
Weight: 4 pounds. Smaller than cock, with comb usually drooping conspicuously, with tail set at 40° angle, with fewer hackles and almost no sickles.	Weight: 4 pounds. Smaller than cock, with much smaller comb and without the hackles and sickles common in the cock.	Weight: 7½ pounds. Much smaller than cock, with drooping comb, wider wattles, no conspicuous hackles or sickles. Tail carried at 40° angle.	Weight: 6½ pounds. Smaller than cock, with smaller, more drooping comb. Tail smaller, without sickles and carried at 45° angle.	Weight: 4½ pounds. Smaller than cock, with comb conspicuoulsy drooping, smaller wattles and ear-lobes, tail carried at 40° angle and without the conspicuous curved sickles of the cock.
Weight: 4½ pounds.	Weight: 4½ pounds.	Weight: 7½ pounds.	Weight: 6½ pounds.	Weight: 4½ pounds.
Weight: 3½ pounds.	Weight: 3½ pounds.	Weight: 5½ pounds.	Weight: 5½ pounds.	Weight: 3½ pounds.
Leghorns as a breed were first developed in Italy. It was introduced into America at about 1835 since when and where it has been greatly improved by breeding for egg laying and for early broiler production. Its white ear-lobes help distinguish its members from the red-lobed Asiatic breeds whose form may be somewhat similar.		Minorcas were called Red-faced Black Spanish but have been developed now into the largest of all of the Mediterranean breeds. Popular in America in 19th century, also popular in England.	Possibly the oldest of all of the Mediterranean breeds and has contributed good qualities to many better known breeds.	Originated in Italy probably near the city of Ancona. One of the older Mediterranean breeds. Introduced into America about 1890, into England late in the 19th century and locally highly popular.
Developed for egg-laying and for broiler production. Eggs: large and white. Individuals known to lay 1,000 eggs in a life time. Broilers may be produced in 8 weeks from hatching time.		Bred largely for egg-laying qualities, the eggs being large and conspicuously white.	Bred now largely for eggs but not popular in America.	Bred for egg-laying. Eggs: medium in size, white.

GENERAL INFORMATION

Management for egg-laying involves many factors. Normal procedures call for selection of vigorous parents. Breeding hens to be used in January for egg production are forced to molt by November 1st by removing feed and water for 1 day, then allowing hens to rest 60 days during which they are given all the grain they will eat and all the wet mash they will clean up in 15 minutes. Pullets and hens should be kept separate to avoid disease and spread of parasites. Cull non-producers in September or in July and in October. Hen may lay over 300 eggs a year. Males are selected as breeders of fruitful hens. Masculinity, early maturity, vigor are qualities sought. 4½ to 5 square feet of floor space per chicken and 5 inches of roost space per individual is considered desirable for successful growth.

soil and air. So, while there must be something of value in the production of hybrid chickens, there are many practical difficulties that must be faced, and which an amateur can hardly hope to master.

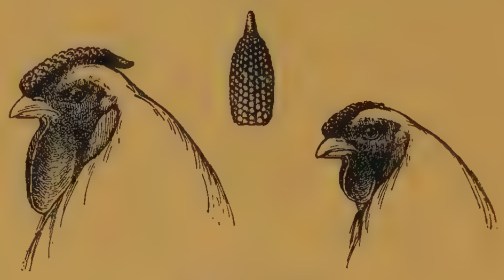
In the tabular material that accompanies this article are given details regarding the recognition of the major breeds of poultry. Under each breed is given some information regarding the history of its development, and, in some cases, notes showing from what other breeds the one in question may have been developed. Also there are given, at the bottom of the tabular material, accounts of the essential life history of a chicken, the names used to designate the age and sex differences, the qualities and practices recognized in raising the different birds for particular purposes, and other data. These points need not be repeated here but they may well be read to afford a more rounded concept of the economic importance and the general biology of the hen.

The illustrations should show the essential differences in some of the breeds. It might be well here to review the differences to be found in one important structure at least. In the pictures will be found combs of different types. The notes will show that a given breed may have both rose-comb and single-comb varieties. In the case of the White Leghorn, both are shown and treated as separate breeds. Had the other breeds been handled similarly, we might have multiplied considerably the number of kinds recognized.

The single-comb shown so frequently in the illustrations may have many variations. It may be erect or lopped, thin or fleshy, smooth or rough, with few or many notches, deeply or shallowly cut, brilliantly red or otherwise. Chickens with this type of comb are found in many breeds such as the Leghorns, White-faced Black Spanish, Minorcas, Javas, Dorkings, Cochins, Langshans, Orpingtons, Games, Rhode Island Reds and Plymouth Rocks. In each of these the size and nature are usually somewhat different in the different sexes and at different ages.

The rose-comb is a solid, thick comb ending in the rear in a conspicuous spike. It is found in such breeds as the Leghorns, Wyandottes, Hamburgs, Dominiques, Rhode Island Reds, Black Minorcas, Plymouth Rocks and others.

MALAY



WYANDOTTE

BUFF COCHIN

SINGLE-COMB BLACK MINORCA

The pea-comb type resembles three low, thick, slightly notched single combs grown together with the center comb slightly higher than the bordering two. It is found in Brahmas, Indian Games, Sumatras, Buckeyes and others.

The V-comb type consists of two small, divided horns or leaf-like projections that vary greatly. They are illustrated in the La Fleche, Polish, Houdan and Crevecoeur breeds.

The strawberry-comb type is a more fleshy comb that looks not unlike a strawberry. It is found in the Malay breed only.

In all probability, the agricultural college in your state has literature that may be helpful to you in solving any of the problems that might arise locally, should you decide that you want to retire and raise chickens. We do not have space to devote to the details of housing, feeding, delousing, killing, dressing, marketing, culling and caring for chickens. Each of these activities has details the mastery of which may be essential to success, or may mark the difference between success and failure.

Those of us who spent much of our time as children caring for the chickens because our parents did not want to be bothered with such chores have mingled feelings about poultry raising. I raised Black Langshans as a youngster. After I had raised, fed and handled these huge, gentle birds, I got no joy whatever in having to take the trusting critters and chop off their heads. By the time I had watched what I had tended flop around blindly and had plucked its feathers and turned the remains over to the kitchen, I had no stomach for eating chickens in any way.

If any of you have ambitions to raise chickens for a living, it would be most advisable that you spend at least one entire year learning the tricks of the trade from some established producer. By the end of that time, you may not be so enthusiastic. At any rate, if you have invested no capital, you will lose none, so look before you leap into the chicken business.

So we may lay aside our pen and bow to Oliver Herford's lines, which read:

"No wonder, Child, we prize the hen
Whose Egg is Mightier than the Pen."

More on Small Sanctuaries

We receive frequent letters asking how an individual can establish a small wildlife sanctuary and effectively protect the animals given refuge there. We are able to give some practical advice and references, but on the matter of protection we must always say that no cooperation may be expected from the State conservation or fish and game administration, from the gunner, or from the courts. This is absolutely true; indeed, a refuge owner is often the object of persecution merely because he enjoys birds and mammals and likes to have them around.

A case in point gives us an opportunity to restate the case; to air the situation that prevails, with variations but the same basic attitudes, all over the country. The place is Rhode Island. The sanctuary is in a small duck-marsh area, and is a wornout farm on which has been developed a natural wilderness. The tract is host for more than 150 species of birds in the four seasons; more than 500 birds are fed daily during the winter. The owner has no objection to hunting except "the illegal and ruthless slaughter not only of ducks but of other birds shot just for a mark to shoot at, and also all other forms of wildlife."

Reasonably enough, we think, the owner of this sanctuary feels that the area is entitled to protection. Instead it is found that the attitude of gunners is typified by one hunter-trespasser who said that the hunter paid for his license and was therefore entitled to any and all game, and that non-paying people had no right to forbid shooting over the land. This owner asserts that she herself would be glad to pay a fee if, in return, she could obtain posters stating that the individual owner had paid a fee to keep his property free from hunting. This, in our opinion, would be paying for freedom from trespass, which should not cost money, but it illustrates the reasonable attitude of this wildlife enthusiast.

Our Rhode Island friend makes another point that makes sense to us. She says that people in administrative positions know far less of what is going on than do people confronted with the actual problem. This sanctuary owner, for example, has seen what is happening to the ducks. Where the little projections of salt water and marsh project into the area there used to be many mallards and black ducks the year around; more during migration. Now it is an event if one black duck nests there. In the duck season shooting goes on for more than an hour after sunset; other violations are numerous.

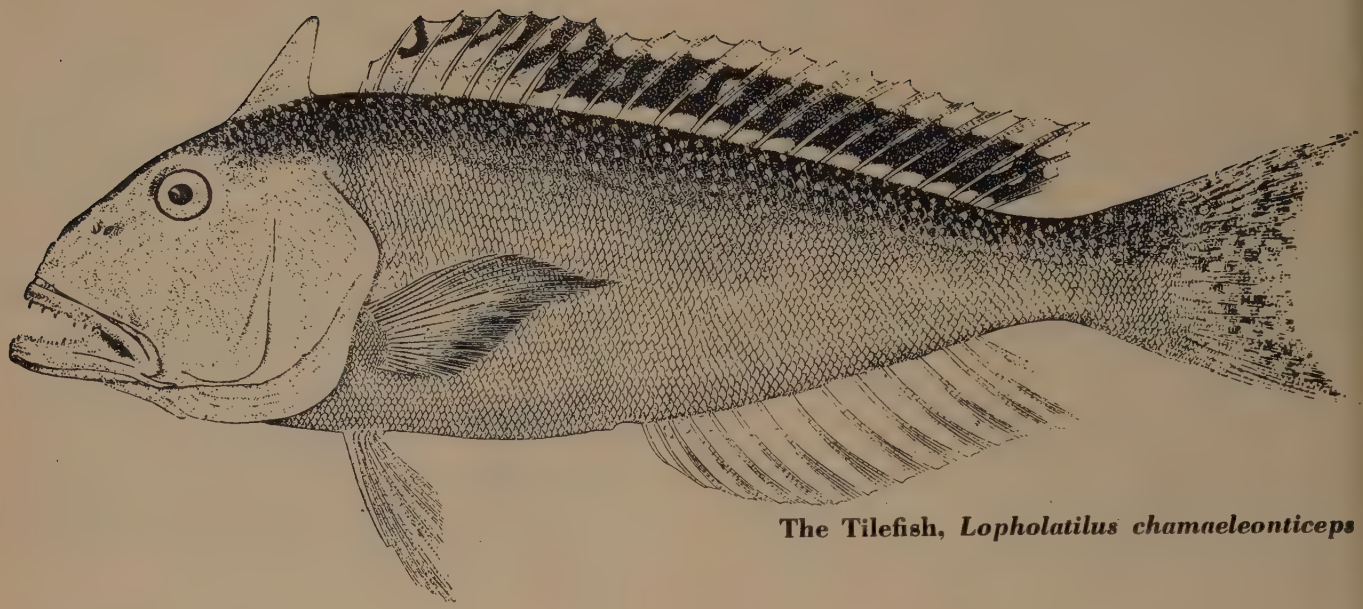
If any protest is made about violations, retaliation takes place. Offended duck hunters "can do much harm, such as setting fires and destroying things. As it is they have torn down many posters, sent shots whistling past my ears, sent in many a barrage of shots from farther down the road." Our friend, when she encounters a trespasser, tries to talk to him reasonably and to build up a few friendly contacts among the gunners. One convert, a former lineman, fixed up an osprey nest on a hurricane-wrecked pole, and said that if "he had a place like this he would do exactly as I was doing."

"Perhaps," she writes, "a sanctuary association might win friends—or at least respect—so that recognition of an individual's right to hold sanctuary might counterbalance the feeling of ownership the license gives the gunner. I did lose my temper once last winter when a gunner walked in our driveway and shot a mourning dove at a feeding tray back of the barn. . . . I had a sign not ten feet from the driveway, but decided that I probably needed one on the front door!"

Our Rhode Island friend can cite many, many more experiences with the gunning fraternity that reflect adversely upon the minority of decent sportsmen among them. Her situation and problem are not recited here as an isolated instance; similar reports have come to us from many places, and from many people who have tried to protect the wildlife on their own property.

The decent sportsman will say of this condition that it does not apply to him, and that there is nothing he can do about it. He is wrong. There is a great deal that he can do about it. He can educate less enlightened fellow gunners. He can support some proper attention on the part of game officials and the courts to the rights of individuals who may happen to care for wildlife for wildlife itself. He can mobilize organized sportsmen's groups back of a law-abiding pursuit of their recreation.

Gunners fail to realize that they are a minority of the population; a rather small minority. They do, more often than not, have an exaggerated idea of what payment of a small license fee entitles them to. Being organized, and having power through fish and game commissions supported by their money, they are often inclined to be too smug in their position. But, by building up an ever-increasing animosity through practices and attitudes cited here, they are making enemies. Decent sportsmen know this. We know many who admit it. Non-gunners can be pushed around only so much; pushed far enough and often enough, they may become a power, also.



The Tilefish, *Lopholatilus chamaeleonticeps*

The Case of the Disappearing Tilefish

By EDNA N. SATER

On March 20, 1882, when the Norwegian bark *Sidon* docked in Boston with a cargo of sugar from Cardenas, West Indies, the master, Ole Jorgensen, brought this story of a weird encounter with dead fish floating on the surface of the ocean in the North Atlantic.

"The weather was cold and stormy on Tuesday, March 14, when we first sighted them," he told his friends on the pier. "A strong northwest wind was whipping the waves into a frenzy. It was about 1 p.m. when we got close to them. I noted our position. It was latitude 40 degrees and longitude 71 degrees. As far as the eye could reach we were surrounded by dead and dying fish—thousands of them, even millions of them, I guess, floating on the surface of the water. They were big fish. Some of them were three to four feet long. Our speed was six to eight knots an hour. We ploughed through that rough sea for 50 miles, with those big fish coming up on the crest of the waves and slapping against the sides of our vessel."

A reporter from the *Boston Daily Advertiser* seized upon the strange story and gave it prominence in the columns of that paper's March 21 issue. Down in Washington, D. C., Professor Spencer F. Baird, U. S. Fish Commissioner, received a copy of that story a day or so later. Immediately he began an investigation to determine the extent of the tragedy and to ascertain the species of fish involved. Early reports, while conflicting, had tentatively identified them as codfish.

Because Commissioner Baird was thoroughly familiar with the area in which the dead fish had been seen, he suspected from the first that they were not cod but tilefish—a new species which had been discovered in vast numbers in 1879 in the waters bordering the Gulf Stream, between Hatteras and Nantucket. On March 24 the Commissioner instructed his correspondents in Atlantic seaports to collect all possible information bearing on the subject. Shortly thereafter a specimen of the dead fish was sent to Commissioner Baird, who quickly identified it as a tilefish. Thus the question of identification of the principal species involved in the catastrophe was settled.

The tilefish, rivaling in color the rainbow-hued coral reef fishes of tropical seas, had been described as "the most gorgeously decorated marine fish in northern waters." Seafood connoisseurs of that day said its only rival in flavor was the much-touted pompano.

To Capt. William H. Kirby, of the fishing schooner *William V. Hutchins,* goes the credit for discovering the tilefish. In May, 1879, while fishing near the hundred-fathom curve south of Nantucket in search of cod and hake, the captain caught several thousand pounds of a "strange and handsomely colored fish." He sent a specimen to the U. S. National Museum, where it was examined and declared to be a new genus and species. The lengthy name of *Lopholatilus chamaeleonticeps* was tagged to it, meaning a "crested tilus with a head like a chameleon." For popular use, however, by perpetrating a pun on the fourth syllable of the first name, the new species became known as the "tile" fish.

The report on the dead fish floating on the ocean made by the skipper of the *Sidon* was only the forerunner of many similar ones to pour into New York and Boston during March and April of 1882. Hard on its heels came stories from at least twelve other vessels

elating their encounters with these fish so strangely ead.

In reviewing the mass of reports which came into is office, Commissioner Baird found that the bark *Plymouth*, of Windsor, Nova Scotia, en route to New ork, was the first to encounter the dead fish on March 3. "We were sailing off the George's Bank," eported Captain Lawrence. "About daylight on Sunday morning the mate came down into the cabin and aid that the bark was passing hrough a lot of dead codfish nd wanted to know if he should et some of them. I went out on deck and saw that the water all around us and for miles back of us was filled with these fish. Their gills were red and upon scooping up some of them I found that they were hard, showing that they had not been dead very long. From 6 o'clock in the morning until 5 o'clock in the evening we were passing through this school of fish and as we were sailing at the rate of six knots an hour we went through 69 miles of them."

When an incredulous reporter, suspecting a "fish story," suggested that "69 miles of dead fish were some fish," Captain Lawrence replied, "You're right. When I first reported the facts here in the city I said there were 15 miles of them. I thought evrybody would think it a 'fish story' if I said 69 miles."

On March 10 the brig *Rachel Coney*, of Bangor, Maine, sailed for 40 miles through the dead fish. "They were first noticed about 75 miles south-southwest from the lightship on the South Shoal of Nantucket and we continued to see them for seven hours, the brig running along about six knots," Capt. Lawrence Coney reported.

On March 15, the day after the *Sidon's* encounter, Capt. James W. Rich's vessel sailed through the dead fish for 50 miles on a west by south course.

From March 20 to 25, however, the dead fish seem to have covered the largest areas, and during this time the reports of their having been seen were more frequent than either before or afterwards.

On March 20, 45 miles south of Shinnecock, Long Island, the dead fish were sighted by the ship *British America;* on the same date the steamship *Beila* reported them 60 miles south of Barnegat. On March 21 the bark *Elizabeth Ostle* sailed through the sea of dead fish. A writer in the New York *Times* of March 26, 1882, gave the following account of an interview with the captain of the *Elizabeth Ostle*, one of the few vessels to obtain a specimen of the dead fish.

"Going on board the bark just in from Calcutta, Capt. O. Lamb, the master, said that on the 21st of March, when about 65 miles off shore from Barnegat, he sailed for 40 miles, at least, through waters filled with these dead fish. Asked if he could describe the number of fish in a given area, taking his ship's cabin as indicating the space, Captain Lamb replied that 'there would be fully 50 dead fish within that space. The sea was quiet and we were going about from four to five knots an hour, and we sailed for some seven to eight hours, say 40 miles, with these dead fish alongside of us. There were millions of them.'"

The climax of the reports came when the schooner *Navarino*, bound north, stated it had struck the area of dead fish on March 21 and ploughed through them until the night of the 22d. a distance of 150 miles.

On March 22, Captain Larsen, of the bark *Alf*, sailed through the dead fish for 60 miles.

Captain Porter, of the bark *Avonmore*, said, "On March 25, when in north latitude 39 degrees 15′ and about 100 miles off land in a southeasterly direction from Barnegat Light, we passed for four hours, sailing under a five-knot breeze, through thousands of dead fishes which were floating on the calm water. The fish were grouped together in lots of a dozen or more, while others were scattered singly. During all this time they were never out of sight."

On April 20 a floating fish was seen and captured by Captain McClain of the schooner *Herald of the Morning*. About the same time dead fish were seen floating on the surface by the crew of the schooner *William S. Oakes* 40 miles in a northeasterly direction from where the specimen was obtained by the *Herald of the Morning*. The last mortality account came in from the fishing schooner *C. C. Warren*, whose crew saw dead fish about May 1 off Cape May.

The reports from all of the captains who saw the dead fish agreed in this respect, that, while the fish were seen in small numbers in some places, for the most part they were so thick on the water that the vessels as they sailed along turned from either side of their bows "windrows of floating tilefish."

Summarizing the material gathered from so many sources, Commissioner Baird (Continued on page 545)

Christmas Thought

By DOROTHY M. COMPTON

The world is full of greed and strife,
What folly,
When by the sea still gleams the
Christmas holly.

Most brilliantly this year it shines,
Full-berried,
As if to point the way to peace,
Unwearied,
To symbolize, in red and green,
Love's season,
The only hope that's left a world
Lost reason.

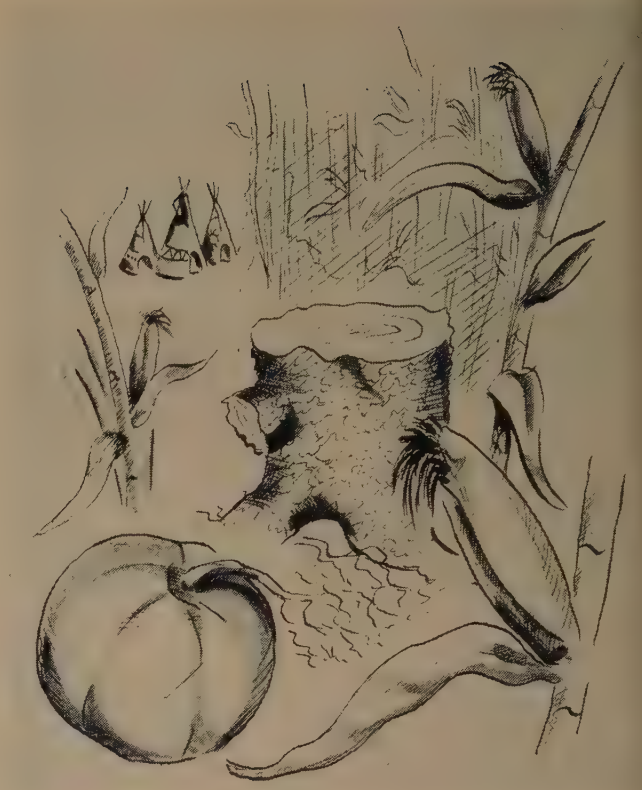
In red, the warmth of love outpoured,
Self-sharing,
Home fireside glow outspread world wide,
Hearts caring;
In green, a sign all is not lost,
Our yearning,
New life—new worlds—will rise with spring's
Returning.

We are so blind—no laws can halt
Man's danger,
The holly leads us to a
Christmas manger.

Sowing in Season with Indian Wisdom

By ROBERT C. BAUR

Illustrations by William H. Bodge



WHEN the Planting Moon had arrived, and the oak leaves swelled to the size of a mouse's ear, the early American Indian planted his crops. According to history we are told that North America was inhabited, at the time of Columbus, by some 846,000 Indians, who lived off the land by hunting, fishing and trapping. However, during the summer months there were small garden patches about the hunting lodges, and these were cultivated with crude hand implements by the women and children. How did these early Americans plant their crops in those days with no gardener's guide to consult, or colorful seed catalog to select from?

Although the white man credited him with being little more than a savage, our debt to the Indian is great, considering the fact that many of the principal crops produced on American farms today were first introduced by the Indians. The early explorers found corn, pumpkins, tobacco, lima beans, squash and many other fruits and vegetables growing in a high state of perfection in the New World. These foods had previously been unknown to Europeans. Maize or Indian corn, the basis of Indian agriculture, was as important to America as rice is to Asia.

Squanto, friend of the white men, discouraged the Pilgrim Fathers from planting grain they brought from Europe, and taught them how to burn over the land before tillage, and to fertilize the soil with fish before putting in a crop of Indian corn. Settlers learned that Indian corn was an excellent frontier crop, yielding in the wilderness sixty to eighty bushels per acre. Besides the ground corn meal providing pone, mush and johnny-cake for the table, the stalks were used as fodder for the live-stock, and the dried husks made stuffing for mattresses and pillows. Even the cobs were put to use, being burned for fuel or fashioned into pipe bowls by the men folk during the long winter evenings.

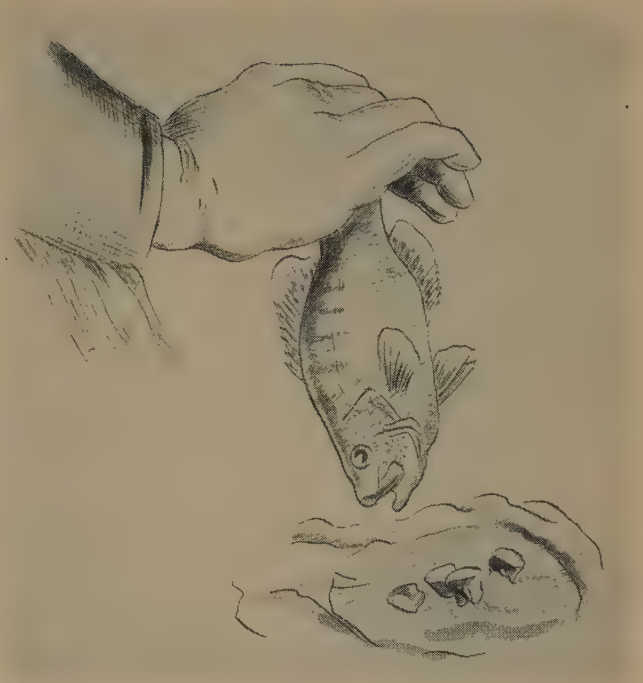
For several seasons I have successfully cultivated an Indian garden according to the methods employed by the eastern Indian tribes. Having only primitive tools to work with, the Indians could not clear large tracts of land, and killed the trees by burning, or cutting a ring of bark off the base of the trunk. Planting day was always a great occasion in the life of the Indian village, and was preceded by a ceremony conducted by the medicine man, in which the Great Spirit was called upon to bestow his favor on the new crops. As soon as the ground is workable in the spring, I turn over the soil between the charred stumps with an ordinary garden spade, not having the shoulder blade of a moose at my disposal, or the patience to use a clam shell tied to a forked stick as the Indians did. With an eye on the oak leaves, I always arrange a fishing trip to coincide with the proper time of planting. There were no expensive chemical fertilizers to be had in the forest, but the Indians knew how to give their seed a quick send off by placing a small fish in each corn hill. If use of an entire fish seems wasteful, several non-edible heads combined in a hill are just as effective. Scooping out a shallow groove about two inches deep, I drop in the fish and place four seeds around it. Three kernels are sufficient, but one for good measure gives allowance for marauding crows and squirrels. I save my seed each year, but the beginner may obtain enough for a start from any reliable seed grower. To insure sufficient sunlight I leave three feet between each hill, placing them, whenever possible, where the wood ash is thickest. Then I poke pumpkin seeds at random throughout the corn. Choice of seed is optional; the small sugar pumpkins are finest for cooking because of their sweet flesh, but the larger varieties are recommended if size only is desired. While other things may be raised in this manner, I usually limit myself to planting corn, pumpkins and gourds, which are easily grown and make an interesting and attractive combination.

Gourds are fascinating plants to grow, and the unusually shaped fruit can be fashioned into bird-nest-

ng boxes and decorative household ornaments. They require, besides a long growing season, rich soil and plenty of sun. Originating in the Tropics, gourds have been grown for centuries, the gourd vine being mentioned in the *Bible*. Gourds were used by the American Indians for water jugs, dippers, and rattles for their various ceremonial dances. There are two types of gourds, the ornamental, or *Cucurbita pepo*, which is yellow-flowering and a day-bloomer, and the hard shells, or *Lagenaria*, whose delicate white flowers open only at night. I have found it best to plant the ornamental gourds a short distance away from the rest of the garden, because the bees, attracted in great numbers to the large flower heads, are likely to cross pollenize the pumpkins with the gourds. While the strain is not greatly changed, it is enough to ruin the enduring qualities of the gourds and spoil the pumpkin flavor. As the *Lagenaria* is a night-bloomer, isolation is not necessary. Hills should be eight feet apart, placing six or seven seeds around a fish. A trellis of sticks may be erected for the large-sized hard shells to obtain unblemished fruit. For the best results the ornamental gourds may be picked as they ripen, but the hard shells should be left on the vine until after frost and then stored in a cool, dry place. It takes from three to four months for the shells on the Lagenarias to harden. When the seeds inside the gourds begin to rattle they are cured and ready to work on.

After planting, the Indian garden should be hoed and weeded until the vines begin to run; then the thick vines penetrating the corn patch choke out the weeds and your troubles are over. Crows are likely to be a nuisance, especially if the garden is in a wooded area away from the house. One pleasant duty of the Indian children was to play noisy games in the corn fields to frighten away the crows and blackbirds until the seed sprouted beyond the danger stage. It was while watching the corn field that many young Indian boys acquired skill with the bow and arrow. I was gravely concerned when an industrious woodchuck opened up an exit from his subterranean apartment at the edge of my garden. For a time it looked as if either garden or woodchuck would have to go, but there was no need for alarm. Perhaps he craved a more varied diet than my garden had to offer and went elsewhere for dinner, as he ignored my crop completely, chuck and garden having flourished in neighborly peace through many plantings.

Autumn's Moon of Falling Leaves has always found



me amply rewarded for my efforts with red and purple ears of Indian corn and grotesquely shaped gourds drying in the shed, not to mention the mouth-watering prospect of home-grown pumpkin pie. A corn dance celebrated an abundant harvest among the Indians during this colorful interlude before winter descended upon the land, similar to our observance of Thanksgiving. While this method of planting is not advised for large-scale farming, Indian gardens are a novelty and quite practical if you have a piece of burned-over woodlot unfit for other use. Vacationers who lack time to plant a large garden, or find the area about their summer place too shaded for flowers and vegetables, will find that a few hills of corn and pumpkins scattered about Indian style in the clearings among the trees will pay dividends in harvest and enjoyment. Children are attracted to this form of gardening, and it is a fine way to stimulate the child's interest in growing things. A small plot set aside for the child will provide lasting pleasure throughout the summer, at the same time increasing a knowledge of history and botany. If you like adventure and wish to leave the hurry of the modern age for a few hours, why not return to the primitive and plant an Indian garden according to Nature's own calendar, just as the early Americans did?

White Wealth

By ELISE LEIDHEISER GIBBS

Lifeless spikes of goldenrod,
Growing in a row,
Changed to diamond scepters
By the magic of the snow.

A jewel-studded coronet
On beggar barberry—
Treasure that no man can hoard,
But any man may see.

To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

The Hyades and Pleiades in Taurus

By ISABEL M. LEWIS

Among the many objects of special interest now visible in the winter evening skies, one will have no difficulty in finding the two famous clusters in Taurus, known as The Hyades and The Pleiades, which have been celebrated in song and legend all over the world from the earliest days of recorded history.

The Hyades, in the form of a V, outline the forehead of The Bull. The group is easily recognized by this distinctive appearance, and because the brilliant, red, first magnitude star, Aldebaran, tops one branch of the V. It is supposed to represent the fiery red eye of Taurus. Aldebaran is not a true member of The Hyades star cluster since it does not share in the common velocity and direction of motion of the stars that belong to the cluster. It is one of the stars nearest to the earth, at a distance of about 54 light years, and is seen projected against the more distant moving cluster composed of stars bound loosely together by their mutual gravitational attraction, and journeying onward through space like a great flock of birds flying toward a common destination.

The Hyades were known as The Rainy Hyades, since the word Hyades was supposed to be derived from a Greek word meaning "to rain," and they were so referred to in the literature of all nations. Mariners in particular held them in disfavor because they were associated with the rainy seasons, and were supposed to bring storms and tempests and generally disagreeable weather.

The Pleiades, which lie about ten degrees to the northwest of The Hyades, are, for more than six months in the northern hemisphere, one of the most beautiful and easily identified objects visible in the night sky. They have always been regarded with high favor in all lands. They appear to have been widely associated with religious and other ceremonies, and there is probably no more popular group of stars in

the heavens. They have been often referred to as The Seven Sisters, and the story of the Lost Pleiad and the "Seven Sisters Who Now Are Six" persisted for centuries. It is possible that at some time in the past one of these stars was more luminous than it is now, and that this led to the belief that it had become lost, when its brightness faded beyond visibility to the naked eye.

The Pleiades have been poetically likened to a swarm of golden bees clustered upon the mane of Taurus, although they are generally supposed to be located upon the shoulder. One with fair eyesight will readily see six stars in this cluster in the form of a small dipper. Sharper eyes, with exceptionally fine seeing conditions, have seen, without optical aid, as many as 11 or 12 of the brightest stars in the group. Actually there are known to be 250 stars in this cluster, having a common motion through space. It is suspected that the actual number will be found eventually to be close to 500 as more extensive studies of the group are made. Most of the brightest stars are enmeshed in nebulosity, which is believed to be cosmic dust shining by the reflected light of these stars associated with it.

These two famous star clusters are known as loose, or open, galactic clusters. They are members of our own galaxy, or Milky Way system of stars as distinguished from the great globular star clusters that are much more compact, and are composed of thousands or tens of thousands of stars, as compared with several hundred stars in the galactic clusters. The globular clusters are not members of our Galaxy but lie far exterior to it at distances ranging from 20,000 to 200,000 light years, and are found both above and below our great galactic system. Some of the galactic clusters, including both The Hyades and The Pleiades, are in our own immediate neighborhood. Our solar system is actually in the midst of, although it does not belong to, the great Ursa Major cluster, which includes five of the seven stars in the Big Dipper and, in addition, Sirius and near-by stars in Leo, Auriga, and Eridanus. Other well-known galactic star clusters are Praesepe, or The Bee-hive in Cancer, Coma Berenices, and the double cluster in Perseus.

There have been catalogued, in all, 249 galactic star clusters. The members of a cluster are loosely bound together by their mutual gravitational attractions. There are two general types of such clusters, and they are known as The Hyades type and The Pleiades type because these two particular clusters are so well known and so representative of the two types of clusters. The Pleiades, and star clusters of similar type, consist of bluish or white stars, known generally as helium or B type stars, and hydrogen, or A type, stars. They contain no yellow-red giants or supergiants. They are in nearly every instance dwarf stars of an earlier type than our sun, which is also a dwarf star. Alcyone, brightest of the Pleiades, is 1400 times more luminous than our sun, and 15 times more massive, with a diameter about ten times that of the sun. Yet it would be classed as a dwarf. It is bluish-white in color and has a surface temperature of about 13,000 degrees Absolute, as compared with about 6000 degrees for our own sun. The faintest members of the Pleiades cluster, on the other hand, are 200 times fainter in luminosity than the sun. They have about one-third the mass and only two-fifths of the diameter of the sun, according to Trumpler, who has made a special study of this cluster. The temperatures of these stars are low, only about 3500 degrees Absolute. The Pleiades are, then, early type dwarfs, bluish or white and, in general, smaller and less luminous than our own sun, and their most luminous members are associated with and embedded in nebulosity.

The Pleiades are at a distance of 500 light years. The cluster has a diameter of about 50 light years and is receding from the earth at the rate of 5 miles a second. In a galaxy that has an extent of 100,000 light years they are, if not our next door neighbors, at least members of our own community. It has been estimated that, in the more crowded central part of the Pleiades cluster, the stars are 100 times more numerous than in the average stellar region. Yet they cannot be considered greatly crowded together with an estimated average distance between neighboring stars of one or one and a half light years.

The Hyades cluster is even less compact than The Pleiades. Its distance from us is about 120 light years, and its diameter 35 light years. It is moving at the high velocity of 30 miles a second toward a point to the east of Betelgeuse in Orion. There are about 100 members of this cluster. Unlike the Pleiades group, there are red and yellow giant stars among The Hyades; but helium and hydrogen stars, which appear in great numbers in The Pleiades, are not to be found in The Hyades. There are, however, yellow dwarf stars, such as our sun, and also red stars in The Hyades cluster. No reason is evident for the division of galactic clusters into two such markedly different types of stars, that is the early type found in clusters such as The Pleiades, often associated (Continued on page 549)

Light Years

By CHARLES EDGAR GILLIAM

One million years ago
Six trillion miles from here
Dry dust began to glow
With golden cheer—

Unknown, unseen, unheard
In outer cosmic dark,
Its pregnant atoms stirred
And bore a spark.

Above tall pines last night
Where skies oft darker are
Escaped pin rays of light
From a new star.

Six trillion miles are far,
A million years is long—
Yet creation of that star
Foretold this song.

Camera Trails

By EDNA HOFFMAN EVANS

As originally planned, this December section of "Camera Trails" was to have a Christmas shopping theme. But, since ye editor did most of her Christmas shopping in Mexico during the month of August, it is a bit difficult to get into the proper spirit again, especially since this section is being prepared some weeks in advance of the carol-and-holly season.

The gift list this year will not include much that is photographic. Items on it run more to hand-woven textiles, hand-blown glass (or is the proper term mouth-blown), silver, leather and other wares that hail from south of the border. But, in the purchasing of same, there were endless opportunities for the photographer to catch real-life, natural scenes of Mexico at work.

Perhaps such pictures are somewhat afield from actual Nature photography. On the other hand, it is surprising the number of tie-ups one can find with Nature—birds, flowers, mammals—things the artistic Indian craftsman appreciates just as much as his outdoor-minded neighbor from the north.

Take, for example, the pottery town of Tlaquepaque, close to Guadalajara. The Tonala Indians of that neighborhood were ceramic workers before the Spanish conquest. Today, their descendants continue the ancient crafts, painting, free-hand, designs they take from their everyday lives. It is a long-remembered pleasure to watch an untrained native artist paint a gorgeously plumed bird, a colorful macaw, a graceful crane, on a set of decorative tiles. He has no model and he makes no preliminary sketch. Still, he paints with swift, sure brush strokes, and we marvel as the bird takes life and form under his fingers. Nor is he just duplicating a set pattern, for no two designs are ever the same.

Over there in another corner sits a 'teen-age boy, cross-legged, deftly painting fish, flowers, deer or donkeys on new-molded saucer after saucer, while the pile grows high around him. It is a scene for any photographer to thrill over.

Then down the street we go, to visit another home, where almost every member is a natural artist. Father Antonio is, and so is 17-year-old Roul and 16-year-old Sofia. Antonio favors rampant deer, virile prickly cacti, scenes from the mountains and jungles. Roul likes birds—caracaras swooping on their prey, eagles with beaks agape and talons outstretched. Sofia likes flowers, gay and colorful.

The family itself is photogenic, from the wrinkled, almost toothless grandmother down to the grinning toddlers. We pause by the bed of Mama to compliment her on the latest addition to the family, five days old and number thirteen. Alas, the *niña* is too young to be photographed. Perhaps the camera has an "evil eye." *Quien sabe?*

Jorge poses beside the Stone of Jaguars, an archeological treasure on Monte Alban, Mexico.

A 'teen-age Tonala Indian boy sits cross-legged, deftly painting designs from Nature on newly made pottery at Tlaquepaque in Mexico

Moving on, we find other chances for photography with a Nature twist. There is the Stone of Jaguars, an ancient relic found among the tremendous ruins on Monte Alban, the pyramid-and-tomb-decked hilltop that looms above the present day city of Oaxaca. Jorge, our temporary *muchacho*, poses solemnly beside it.

Mexican kids, themselves, are photogenic. Besides that, they are unbelievably obliging. Some tourists resent the "blasted kids," but, in doing so, they isolate themselves from some of the best things of Mexico. The boy may be grubby, snaggle-toothed and ragged. But he can take you to see craftsmen tucked away in patios or dark little rooms. With him as guide, you will see the real arts and crafts of Mexico, as well as the real artists and craftsmen who produce them.

It was Juan, in Patzcuaro, who took us up a cobblestone road, down an alley, and into a small dark room where four boys and a man were working away on lacquered products. Their motifs—Nature again—were bounding deer in gold on blue lacquer, peacocks, egrets, flamingos, amid flower backgrounds on trays and boxes.

With a flash attachment, a photographer could get excellent results in Mexican workshops. But artificial light is necessary. The weavers, the potters, the lacquer-painters, the leather-toolers and the silversmiths are all tucked away in tiny, dark rooms. To travelers from a land of electric lights and large windows, it seems impossible that a worker's eyes could last even a short lifetime.

CHRISTMAS PROBLEMS

But the above does not do much to solve the Christmas shopping problems of someone in Chicago, Santa Fe, Jacksonville or Flagstaff, Arizona. What is there to buy for the family shutter-bug this Christmas?

The answer is endless and the range is boundless. The horizon is limited only by the pocketbook of the purchaser. Things photographic are much more plentiful than they were a year ago, and there are few empty spots on present-day camera store shelves.

Utility, according to ye photograph editor's way of thinking, is of prime importance. There are countless gadgets, enticing, attractive and, in the end, useless. The Nature photographer has enough to carry around without weighting himself down with things that only a professional with six arms and two assistants could use. Do not clutter up the darkroom, either. Goodness knows, there are enough "musts" in it, without overcrowding it with non-essentials.

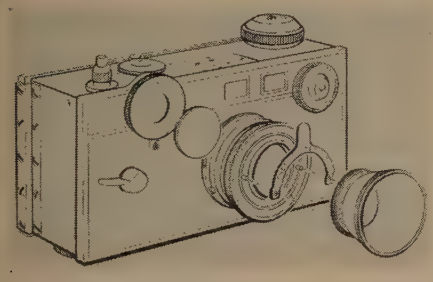
Let us assume that Junior wants a camera for Christmas. Pick a known kind—at a good shop. Do not be misled by the shiny, tricky-looking models you may be tempted to pick up in a drug store or novelty shoppe. It is not the shiny outside of a camera that takes the pictures; it is the lens and the inside mechanism.

The rest of the possibilities are standard, too, and not very

Here is a handy Christmas present—16 photolamps and a Kalart master automatic speed flash, synchronized for all cameras with set and release, between-the-lens shutters and miniature cameras with focal plane shutters.

different from what was available last year. There have been many new "wrinkles" brought out since Santa Claus' visit twelve months ago, but most of them are for the professional photographer, or for the far-along amateur who has plenty of money to spend, and enough space in which to keep a vast quantity of equipment.

For Junior, a subscription to a camera magazine is a present that renews itself each month. A glance at any newsstand will indicate the possibilities, or Junior, himself, may already have definite preferences in this matter. There are many books available, too, on camera



The wishbone-shaped attachment shown here permits the Argus cameraman to change his lens aperture without removing his sunshade.

techniques. Any dealer can guide your choice, depending on Junior's age and photographic advancement.

And what is true for Junior is also true for the adult camera fan.

Supplies are always welcome—extra flash bulbs, more film, in either black-and-white or the more expensive color. A photographer can use several different kinds of filters and an additional auxiliary lens or two. But he cannot readily use more than one tripod, or one flash gun, or one equipment carrier. Know your man, and try not to duplicate what he already has.

As for actual Christmas material, Eastman Kodak Company began in September to prepare for camera fans who like to make their own Christmas cards. New masks for greeting card production outfits have been turned out, plus a Kodak edge tinting outfit, complete with pens and red and green inks.

Kodak also has two new cameras, intended for delivery by the year's end. They are the Kodak Flash Bantam f/4.5, a pocket-sized number, and the 4 x 5 view camera, designed for professional use. For professionals, also, is the new data book on "Photographic Papers."

Other handbooks that might be useful are "Good Pictures," a 48-page booklet published by Argus, Inc., for amateur photographers, and Eastman's "Picture Taking Outdoors." This latter should be especially useful to Nature photographers who, naturally, do most of their shutter-clicking out-of-doors. Its price is fifteen cents.

A new attachment for Argus cameras, the Chess-United Iris Diaphragm Control, allows the photographer to change his lens opening without removing his sunshade. The control, a wishbone-shaped affair of stainless steel, will be standard equipment with all new 215GS Chess-United filter holders for the Argus camera.

Here is a handy present for folks who can use flash attachments. In the effort to combat the long-lamented flashbulb shortage, the Kalart Company is now packaging sixteen Wabash-Sylvania press 40 photo lamps with their new master automatic speed flashes, and six press 25 photo lamps with their compak passive speed flash. This assures the purchaser that he will have a small supply of bulbs to use in his new flash synchronizer.

And, in case you wonder whether your camera can use a flash attachment, write Kalart Department 91R, Stamford, Conn., for a complete list of cameras and recommended speed flashes. Mention "Camera Trails," of course.

LETTERS

One of the nicest things about going away is returning to read the mail that has collected during one's absence. There were a number of interesting letters waiting from Camera Trailsmen. Ye editor will have more space to give them next month.

Now, one final Christmas note. If you have made your own photographic greeting cards this year, why not send one to "Camera Trails"? I am starting a collection of these, and will treasure all of them. Meanwhile—the very best of season's greetings to all Nature camera fans!

DISAPPEARING TILEFISH

(Continued from page 539)

and his fishery experts established the extremely conservative estimate of the probable number of dead fish as 1,438,720,000, drifting about in an area 170 miles in length and 25 miles wide. At an average of ten pounds each, which was also conservative because large tilefish may weigh 30 to 40 pounds each, the Fish Commission reported that a total of 14,387,200,000 pounds of edible fish was utterly destroyed—about 288 pounds of fine food fish for each of the 50,000,000 inhabitants of the United States—then!

Here is how the loss in poundage in 1882 compares with the total production of our fisheries today. The annual average yield of all species of fish in the United States for the five years preceding World War II was 4.4 billion pounds. The 14½ billion pounds of tilefish destroyed so mysteriously in 1882, therefore, are equivalent to the present day total U.S. catch for more than three years.

Wild theories of all sorts were advanced to explain the tilefish catastrophe, with a submarine volcanic eruption, heat, cold, lack of food, and poisonous gases being listed among them. The specimens of dead fish that were caught, however, showed no signs of disease. Neither was there evidence of parasitic infection. Many of them were eaten because they were so fresh and wholesome.

The theory that was most generally advanced by those who studied the subject was that these fish met with a stratum of unusually cold water which paralyzed and rendered them helpless to such an extent that they floated to the surface of the sea dead or in a dying condition.

Other persons were equally firm in their belief that it was not cold but unusually warm water that destroyed the tilefish. Such an idea, however, was soon abandoned if we may judge by this facetious reference to it in the New York *Times* of April 22, 1882:

"Theories are still rife as to the reasons for the killing of these fish. The Gulf Stream notion, of the fish getting into hot water, not having a leg or a fin to stand on, others are now being ventilated. Said one wise skipper, 'There has been convulsions of nature under the sea. Now, you see, mates, these here loaferlatter lushisses is deep-sea fish. There comes the deuce to pay down below—their bladders gets busted, and up they come like balloons. That's a pint no fish-sharp has studied up yet; don't you see?' "

The "fish-sharps"—aquatic biologists—shook their heads, completely baffled, and there the matter has rested from that day to this. True, the tilefish did reappear ten years later, in 1892, in small numbers. But what caused that terrific mortality and their total disappearance for ten years? Did Mother Nature and Father Neptune conspire to test the effects of an atomic bomb of their own contriving? No one knows. The real cause of that gigantic undersea tragedy is as great a mystery today as it was when it occurred more than six decades ago. The Case of the Disappearing Tilefish may have to be written off as "unsolved." The ocean has succeeded well in cloaking in mystery the comings and goings of its denizens.

The School Page

By E. LAURENCE PALMER

Professor of Nature and Science Education, Cornell University, and Director of Nature Education, The American Nature Association

THE LITTLE RED HEN

A GENERATION ago one of the most dog-eared books in the elementary school library used to be a little book called *The Little Red Hen*. Then along came some people with sensible modern ideas. They began to bring real hens into the classroom. Just today I got an advance script of a movie for elementary school children that shows how the little chick gets out of its shell and what happens to it for the next few hours. Also, today, I heard an advance showing of a sound record that is to be submitted to "Information Please" in which there is a sound that, to all intents and purposes, is nothing more than that produced by a little chick that has lost its mother. Really, it is the sound of a frog, but that is something for Mr. Kieran and his associates to detect. As we have suggested in the special insert in this number of *Nature Magazine*, the new uses of poultry and poultry products in the study of disease, and the phenomenal role played by these products in our modern economy related to foods and living, make chickens something worth knowing a little better. It behooves the schools to bring a little red hen into the classroom now and then and let her take over some responsibility in training the coming generation.

Of course, it is not sufficient to bring a hen into a classroom and leave her to work out her own lesson plan. She never went to a teacher training institution and just would not know what to do. So we may on this page suggest a few fields of endeavor that might be worth while.

Like the famed old gray mare, hens are not what they used to be. Where a generation ago the hens of your barnyard and mine were a cosmopolitan mixture of every breed that was about, today we find that, through man's guidance at least, "birds of a feather flock together," and, as you ride along the highway, one farm yields Barred Rocks while the next glistens with White Leghorns and another boasts of stately Rhode Island Reds. Our modern tendency to specialize has carried on even into the barnyard, and the hen that is today brought into the classroom has a heritage, and is no longer just a Heinz combination of 57 varieties. I know only too well from experience that any teacher now dealing with domestic animals must know her breeds. Only a week or so ago, some children brought to me a domestic rabbit to be used as the basis of an informal radio discussion. Without thinking, I spoke of it as a Belgian hare, but when our story got out over the air some of my listeners were sure I had made a mistake and wrote in to ask if we had not been talking about a Flemish Giant. They were right, and had I stopped to think about the breed, instead of about the critter as a member of a special group of mammals, I would have caught myself. Today, we have to watch our step in these matters. I know of no better help to teachers in these matters than Hungerford's *Types and Breeds of Domestic Animals*, available from the Slingerland Comstock Company of Ithaca, New York, for 20 cents. It helps you recognize the breeds of chickens, ducks, geese, turkeys, guinea fowls, rabbits, goats, sheep, swine, cattle, horses, donkeys and mules.

There is no need here to review the points about poultry raised in the special insert, but many of them should find their way into the lesson plan of a teacher convinced that the pupils should for some reason or other know their poultry better. Neither is there any need here to review some of the patterns that have been followed in the past for studying these animals in school. Any good high school text in agriculture will yield worthwhile information. Much of this may be useful in the study of animals related to poultry. For example, the mapping of the feathers on a chicken may be useful in understanding the terms used in field manuals on wild birds. Wing primaries, tail coverts, hackles, mandibles, sickles describe particular feathered parts of a barnyard hen or a woodland grouse. Similarly, saddles, rumps, shanks and napes are areas that must be understood by anyone using a bird guide to help him know birds in the field, and it is simpler to show these on a living hen in the classroom than to try to do it with a living warbler in the brush. If one must teach something of the anatomy of a bird, then let's stick to our chickens in this connection, partly because chickens are (we hope) being dissected on the dining table of every home in the country at times, and partly because the anatomy of a fowl is laid out on a larger, more easily observed plan than it is in a humming bird.

One of the studies of birds that may well be carried on with domestic fowl that is not suggested in the average school text is that concerned with the psychology of the animals. Most of us have lived long enough to remember the days when any automobile driving by any farm called for all the chickens on either side of the road to attempt, with varying degrees of success, to get to the other side in safety. Now, the chicken that makes such a fool attempt is in the minority, and the dashing car is more likely to be ignored completely by complacent fowl. Then, there is a language of chickens that should not be overlooked by the alert teacher. Boredom, exaltation, fright, invitation, content are all a part of a chicken's life, and all are found duly expressed in the sounds that come from these birds, whether they are young or old. As with us, these emotions are expressed differently as they mature, and there is much difference between the lusty crow of a mature rooster and the puerile attempt of a cockerel that begins to feel he is really growing up. Those of us who grew up with chickens, or who now care for them, recognize the changes that come in the sounds from the chicken house as the hours of the day pass and as the seasons go by. As suggested in the insert, some of these characteristic sounds have found their way into the classical literature on our library shelves. Without some background of practical experience, this literature can not be appreciated to the full. So, get your students acquainted with poultry through some other channel than the delicatessen, the automat or the meat market. Do a little work with the living bird if that is possible.

Any school planning to make any study of poultry should consult the local state agricultural college to determine if it has available free literature on poultry matters. This literature should be collected, possibly bound into a more or less permanent form and kept for use now and in the future. Frequently, some of the better bulletins are available for a short time only, so a rich collection of suitable literature should not be dissipated through carelessness. Of course, the United States Department of Agriculture should also be consulted for possible assistance in the form of bulletins. These publications should all make particularly good reading in the upper grades, where some youngsters may be making plans to go out into the world on their own. Not a few may have their eyes fixed on letting chickens pave the way for their making a living. Some should be encouraged, but many others should be discouraged in listening to this call. It is for this reason particularly that we suggest contacts with *local* agricultural authorities. The prob-

Miracle

By FRANK WALLACE

Along the garden wall
Green caterpillars fed,
And in a baggy ball
Each tucked himself abed.

Wing-wafts above the wall
Glint bright and lyrical;
Green worms averse to crawl
Fly out their miracle.

ns of food, disease and market are not same throughout our land, and be- use one system of techniques may rk in New York it is no sign that simi- r procedures will be found profitable New Mexico. Teachers have an obliga- n to explore the vocational interests eir pupils may have in poultry.

Probably we should not moralize at y time on this page. Nor should we tempt to draw any comparisons be- een national or international matters d activities that may take place in e elementary and secondary schools. e cannot, however, resist the tempta- n that prompted the selection of the tle for this particular school page. Some us wish that the philosophy expressed that little book about the little red en were more generally appreciated. ou may remember that the hen's as- ciates—the dog, the cat, the mouse and e rat—all were unwilling to help the ttle red hen do anything to produce ealth, but that every one was willing live off the results of her efforts. If ou do not know the end of the story e suggest that you read it. If there is ot a lesson in that for the set-up of our odern civilization then I miss my guess a member of the white collar class f the Order of Little Red Hens. The Marshall Plan has a little of the red hen hilosophy in it when it demands some ffort on the part of those who may ben- fit by its adoption. The world seems to e rather too well populated with dogs, nts, mice and rats for the good of us ttle red hens. They can outvote us ometimes, but in the long run there is n economic and a social justice that annot be beaten down. Here's to the little ed hens. Long may they live and soon ay they make their philosophy felt nore generally. And, who knows, some ens may even learn to crow when hard imes come for the rats that have been easting so long on their bread?

Mr. Twigg Errs

Mr. Twigg's Mistake. By Robert Law- on. Boston. 1947. Little, Brown and Company. 142 pages. Illustrated by the Author. $2.50.

Mr. Twigg was the man who put the X vitamins in Bita-Vita Breakfast Food. One day he had a headache, for which he treated himself and following which strange events took place, involving, among others, a mole named General de Gaulle. It was remarkable what the vitamins did to this mole when he came by a package of this breakfast food forti- fied by a tremendous overdose of Mr. Twigg's vitamins. The result is an im- mensely entertaining story by Mr. Law- on, author-artist (he drew Ferdinand the Bull), whose sense of humor is charming. This is no book to be en- joyed only by the younger generation for its audience knows no age limitations.

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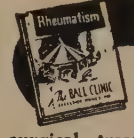

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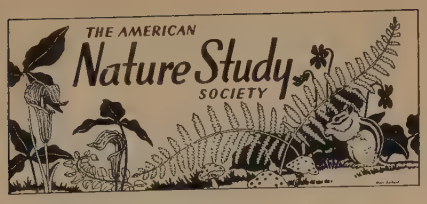

FORTY YEARS OF THE AMERICAN NATURE STUDY SOCIETY

By E. Laurence Palmer

In a gregarious animal like man, it is natural that those with similar interests will join together, not only for the purpose of working in congenial company but to stimulate activities of members of the group and of others. I have known the membership of the American Nature Study Society rather well for thirty-five of the forty years of its existence. I was profoundly stimulated by some of its earlier officers and members, and have found much satisfaction in working with the officers and members in more recent years.

As professional organizations interested in science teaching go, the ANSS is a rather old group. Some of us like to think that the organization stimulated interests that made more youthful organizations possible. Certainly, many of the interests that were developed and carried on by the ANSS in the earlier years of its existence can now be carried better by other organizations. For example, while the ANSS sponsored and published *The Nature Study Review* from 1908 to 1922, much of the public service formerly carried by that agency has since been assumed by the publication of *Nature Magazine* by the American Nature Association. The research studies published in the *Review*, and carried on by the members of the ANSS for many years, have been furthered by other organizations that have developed more recently. But, in spite of the shifting and sharing of responsibilities, there has always been some work, or some philosophy of teaching, that has been done or has been advanced most satisfactorily by the membership in this organization.

Chronologically, among the professional science teaching organizations of national scope, the Society fits into the picture as follows. The Central Association of Science and Mathematics Teachers, whose interests have been developed most strongly in the Middle West, antedates the founding of the ANSS by five years, since it was founded in 1903. Still earlier, in 1895, there had been founded the Department of Science Instruction of the National Education Association, but that organization has since given up its entity. In 1944, it merged with another organization to form the National Science Teachers Association. Earlier yet, in 1875, had been founded the Agassiz Association. It now apparently is not active nationally.

Subsequent to the founding of the ANSS, we find the School Garden Association starting in 1910, and splitting, in 1920, to form the National Council of Supervisors of Nature Study and School Gardens, only to change in 1930 to the National Council on Elementary Science. Between these two dates, or in 1928, we find the development of the National Association for Research in Science Teaching that claimed a major interest in research in the teaching of science. About 1938, there was formed the National Association of Biology Teachers, and, still later, in 1944, the National Science Teachers Association, made by joining the American Council of Science Teachers and the American Science Teachers Association.

This last unit had developed more or less from the old Department of Science Instruction of the NEA.

Through all these shifts and changes for the last forty years The American Nature Study Society has stuck rather consistently to that which was sound in the philosophies of its earlier leaders. With possibly one exception, I doubt if there has been a president of the American Nature Study Society who ever defended what was reported to be the Nature Study philosophy in the recently published forty-sixth Yearbook of the National Society for the Study of Education. Nature study is characterized in that report as "the opposite of natural history, namely, the practically exclusive use of exotic materials; by anthropomorphism, chiefly through nature fables; by teleology; and by moral and religious interpretations of biological phenomena"—about the grossest misrepresentation of a philosophy that it has been my privilege to see in print. This is the antithesis of the nature study philosophy supported by the Society. I believe that the definition was a deliberate misrepresentation. There is nothing of the above philosophy in Bailey's *Nature Study Idea.*

The presidents of the American Nature Study Society during its existence include Liberty Hyde Bailey, C. F. Hodge, Otis W. Caldwell, B. M. Davis, Anna Botsford Comstock, S. C. Schmucker, J. A. Drushel, William G. Vinal, George R. Green, M. R. Van Cleve, Bertha Chapman Cady, A. F. Satterthwaite, Ellis Persing, E. L. Palmer, Edith M. Patch, Ellen Eddy Shaw, George Free, Charles Mohr and Edwin Way Teale. In addition to sponsoring and publishing *The Nature Study Review*, the membership published its own yearbook about the time of Van Cleve's administration. It cooperated in the publication and preparation of the two editions of *The Nature Almanac* published by the American Nature Association. From its founding, it has been affiliated with the American Association for the Advancement of Science, and, since 1916, has had a representative on the Council of that organization. Time and again, it has cooperated in efforts of the groups identified with the National Education Association, and, since 1940, been interested in the continued success of the magazine *Canadian Nature*, which its membership receives. The organization is affiliated with The National Association of Biology Teachers, with the National Science Teachers Association, and has membership on the Cooperative Committee on Science Teaching. It holds its major meetings with the annual meeting of the American Association for the Advancement of Science. The 1947 place is Chicago; the dates December 27 to 30. Normally, the interests of its major officers have been more closely identified with academic science than with professional education, although all have had a strong interest in and respect for the professional education field.

The Society has sponsored and supports a number of scholarships to summer schools in different parts of the country through the years. It has, and has had, active branches in the East, Middle West and elsewhere. It is one of the most democratic of the organizations interested in the teaching of science, but its interests are broader than those of the professional science teaching groups. Its membership is open to "any person interested in any phase of nature study or elementary science." Its dues are the most reasonable of any of these professional organizations. In addition to *Canadian Nature*, the membership receives regularly the Society's *News Letter.*

During its career, the Society has encouraged not only the teaching of nature study, in school and out, but has shown leadership ability in encouraging workers in related fields, such as health, recreation, school gardening, conservation, scouting education, camping education, museum education and humane education. Through its national meetings and through the fellowship of its membership, it has exerted an influence of which it is proud, and while it has sponsored divergent activities it has, on the whole, consistently defended the study of realities here and now. It has influenced profoundly the philosophy that has been supported on the School Page of *Nature Magazine* in recent years, and which may need no elaboration to readers of this summary. The Secretary of the organization is Dr. Richard Weaver, P.O. Box 1078, Chapel Hill, North Carolina, from whom further information may be procured by interested parties.

HYADES AND PLEIADES

(Continued from page 543)

with nebulosity, and the later type, chiefly yellow and reddish stars, appearing in clusters of the Hyades type. Nebulosity among the Pleiades shows an abundance of cosmic dust in that cluster.

In all galactic star clusters there are many stars, some of them brilliant stars, like Aldebaran, that are not true members of the cluster but temporarily within them. It is possible from a study of the "proper motions" of stars, or their motion across the line of sight, and their radial velocities, continued over a long period of time, to determine which are true members of the cluster and which stars have no connection with it physically. Eventually the statistics are compiled and one knows, as is the case with the two well-studied groups in Taurus, how far away the cluster is, how great is its extent, and whether it is spherical or flattened in shape, how many members there are in it, few or many, and how fast it is traveling through space and in what direction. As time passes on, and the observations made many years ago of the motions of the stars in the cluster are compared with those made in recent years, sometimes after a lapse of a hundred years, these statistics on the galactic star clusters become more complete and valuable, and also add to our information regarding the structure of the Galaxy itself.

During the first few days of December Mercury may be glimpsed low in the southeastern sky before sunrise. It will be too close to the sun to be seen later in the month. Venus is now in the evening sky, but it is not far above the southwestern horizon at sunset and will not be well placed for observation in the northern hemisphere.

Mars now rises before midnight, and by the middle of December will be seen a few degrees east of Regulus in Leo; and at the same time Saturn also will be found in Leo about an equal distance to the west of Regulus. It will rise shortly before Mars. At the beginning of the month the two planets are nearly equal in brightness, but Mars is now increasing quite rapidly in brightness and by the end of December will be decidedly brighter than Saturn. It will be interesting to note the relative change of these two planets in position and brightness during the month, and also their marked difference in color. Mars is, of course, reddish, and Saturn pale yellow, in color. Jupiter will be in conjunction with the sun on December 1, when it will pass to the morning sky. It will be too close to the sun to be observed this month.

On December 22 at 11:43 A.M. Eastern Standard Time the sun will be at the solstice and farthest south of the equator; winter will then commence in the northern hemisphere, summer in the southern.

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THE EVERGLADES

(Continued from page 517)

and fox squirrels will tempt the cameras of future visitors to the park.

The huge sea turtles weigh up to 500 pounds apiece. One of the same species of loggerheads caught in the Caribbean is said to have achieved the record of 850 pounds. All three species of sea turtles that frequent the Everglades water have been greatly overhunted at sea and on shore.

The grass-fed flesh of the green turtle makes delicious soup at $2.50 a plate in deluxe hotels. The smaller hawksbill turtle is sought for its commercially valuable "tortoise shell." The ball-shaped eggs of both species, and of the huge loggerhead turtle, are eaten by fishermen and campers—and also by raccoons. If these giant turtles are to be restored to safe numbers in American waters, the adults must be afforded a refuge where they will be protected at all times. During the six to eight week season when the females haul ashore to lay their eggs, they should not be disturbed in any way. If necessary, the beaches where they make their nests must be closed at that time.

West Indian seals are about six feet long. More than a century ago, they hauled ashore on the Dry Tortugas islands, about seventy miles west of Key West, to rest and perhaps to rear their young. The species is rare now and is entirely gone from American waters. The Dry Tortugas are now protected within the Fort Jefferson National Monument, and it is expected that the keys and waters of Florida Bay soon will be part of the Everglades National Park. If a few West Indian seals could be obtained through the British or Mexican governments from the Bahamas, or from the Triangle Keys off Yucatan, the race might be restored to the United States.

The Dry Tortugas keys, named for the sea turtles, are also the only nesting grounds of the sooty and noddy terns within the continental United States.

The last roseate spoonbills in Florida nest in the Everglades National Park. These great pink and white birds have a wing spread of four and one-half feet. They have crimson "epaulets," and their long greenish bills are shaped like soup ladles. Nearly wiped out by feather hunters in the past, the "pink curlews" or "pinks" are still comparatively rare. Their rookeries, as well as those of other birds within the park, must continue to be given a certain amount of privacy and protection from the public. During the nesting season, only ornithologists engaged in vital studies should be allowed to enter the colonies.

Visitors can be brought to the immediate neighborhood, however. Here they can watch from boats or from towers. Binoculars will give them a face-to-face acquaintance.

Do storks bring babies? Many people do not know that we have storks in the United States. Our species is called the wood ibis. In the Everglades it has been restored to many thousands. Flocks can be seen soaring high on the fronts of thunderstorms or gorging on fish, frogs and watersnakes at marshy pools. The smaller but equally spectacular egrets—American and snowy—now number in the thousands. In much lesser numbers, we find the graceful reddish egret, the water turkey, swallow-tail and Everglades kites, chuck-wills widow, short-tailed hawk, white-crowned pigeon, great white heron, purple and Florida gallinules, owls, cormorants, ospreys and many other avian species.

And there is the pelican. This astonishing bird, chiefly represented by the brown species, is only one more of the unique and picturesque members of the Everglades wildlife. Flocks of exotic-looking, flame-colored flamingos occasionally visit the marl banks and shallow ponds to feed on small mollusks. They drop in casually from their real homes in the Bahamas, Cuba, Haiti or Yucatan; wild flamingos do not nest in Florida.

A few stately sandhill cranes dance their minuet in courting season, and sometimes out. Sanderlings flit hungrily on the beaches, darting just out of reach of each wave. The man-o'-war or frigate bird soars far overhead. For hours he floats on the air currents with scarcely a perceptible movement of his wings.

The Everglades National Park is different from all other national parks in the United States. It is a part of the only tropics in the country. Under proper protection, the park waters will furnish some of the best salt water game fishing in the world. They are the home of barracuda, sailfish, marlin, tarpon, sea trout, bonito, amberjack, snook, shark, snapper, grouper, redfish, mullet, mackerel and others.

Most of the "highways" through the park will be waterways. Visitors can enjoy the marine "gardens" without impairing the coral. They can watch the brilliant display of sea animals that are thrilling to watch, but are not good to eat. Squirrel fish, green angels, blue parrots and hosts of others.

In watch towers or boats, through binoculars, visitors can come "face-to-face" with thousands of birds in their nesting colonies. Enthusiastically interpreted by trained naturalists, the animal and plant life of the Everglades will entertain and instruct millions of visitors. It will be an exciting, unique experience not only for present generations but for all generations to come.

SANTA'S REMOUNT STATION

(*Continued from page* 520)

him. He knew that they could not get to him and he took no notice whatsoever of the reindeer dogs, which also moved around as if a sled deer did not exist. Deer that have been in the harness are always picked out with ease, for they wear a collar around their necks and in the winter have their horns cut close, so that they can do little damage to their drivers.

Spring starts the reindeer cavalcade on its northern way again, and in April the herd is driven on to Richard's Island for the fawning. On this island the deer are more or less safe from their hereditary enemies, the wolves; for later on they are surrounded by water. But flies, however, are a great nuisance and so riddle many of the hides as to make them useless.

Early July is roundup time. The herders are taken by boat many many miles from the herd and are left at points from which they converge on the roundup camp. Before them they drive any stray animals, until at last their charges are all gathered once more into one great herd. Miles of fence-posts and wire lead the animals to the corrals, where they are counted, head by head, and the fawns and unmarked beasts are thrown and "branded" by having their ears slit in a certain manner. Thus, even though a reindeer may wander from this herd and join the other herd at Anderson River, farther to the East, all may easily be sorted there at roundup time.

As the sun shows less and less of itself each day, so summer draws to a close and the herd is driven down to the south end of Richard's Island, into the water, and swum across to the mainland once more for the harvest.

It was strange that, no sooner had the herd been driven across by Andy Bahr, than the caribou, as if jealous, began to appear once more on the west side of the Delta. Ever since then they have sporadically appeared and have been hunted by Eskimos and Indians alike. Even so, there has been continued need of the reindeer for fresh meat, and, indeed, the supply has never really kept pace with the demand. The need may become ever greater if at some time in the future the caribou fail again.

Everglades Appointments

Announcement is made by the National Park Service of the appointment of Daniel B. Beard as superintendent of the new Everglades National Park and of H. Raymond Gregg as park naturalist of the Park. Both men have outstanding records with the National Park Service, and will bring valuable experience to the many tasks connected with launching the new park organization.

Some idea of the problems that will confront Mr. Beard and Mr. Gregg may be gained from the excellent discussion of the Everglades by Victor H. Cahalane in our leading article this month.

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ADVENTURES WITH SLOTH

(Continued from page 524)

support to which he clung. I could pick him up and handle him as I pleased, and he never offered the least resistance. Even when I opened his mouth to examine his dentition, he submitted with perfect passivity. I know no other undomesticated animal of half the sloth's size that I could have handled so freely and with so much impunity. Scarcely any other vertebrate with which I am familiar is so spiritless, defenseless and unemotional, or leads a life that seems so purely vegetative. But the sloth's whole behavior is in keeping with its appearance. Its hair is the same color as the bark of many a tree. Like the bark of a tree, it is the host of small green algae, which seem to add to its camouflage; and gray moths take refuge among it, as they might settle on a tree trunk. As the sloth sleeps doubled up in a crotch, it bears considerable resemblance to the big nests of gray carton built by certain tropical wasps. Were the sloth an animal of more vigorous movements, these would betray its camouflage and make it more conspicuous to its enemies.

In the Costa Rican highlands, I have seen only the two-toed sloth, *Choloepus hoffmanni.* It is not uncommon in the wilder mountain forests between 5000 and 6000 feet above sea level, far higher than I have ever met the three-toed species. Its abundant coarse gray hair, even longer than that of the three-toed sloth, hangs loosely below its back like a shaggy mane and seems to fit the animal for life at altitudes where rainstorms are cold, hard and long-continued; yet it dwells also in the hot lowlands. Small algae impart a green tinge to the pelage of the back, as with the three-toed sloth. The two species are equally slow and deliberate in their movements, equally hard to arouse when slumbering rolled up into a gray ball in the crotch of a tree or amid a tangle of vines, and equally indifferent to danger, at least when it approaches in the human form. In the Costa Rican mountains, the two-toed sloth feeds by preference on the pinnately compound leaves of the tree *Brunellia costaricensis,* just as in the lowlands the three-toed sloth prefers the foliage of species of *Cecropia,* although it will eat other kinds.

I found parent two-toed sloths with young in June, July and August. The single sloth-cub rode on the breast of its mother as she moved along in the usual inverted position. Its breast was turned toward hers, and its long claws were tenaciously imbedded in her coarse fur. The youngster's shorter fur is everywhere very thick, dense and soft, with nothing of the coarseness and harshness of the adult's pelage. The hairs on the body and limbs are cinnamon-buff on the ends, but basally gray; and the superposition of these two colors produces a shade difficult to describe.

In August I watched a female sloth with a baby on her breast feeding in the top of a lofty tree. Presently the youngster pushed forward between her arms, pulled a twig toward itself, and also began to munch the foliage. After a while, it left its mother's upper surface to cling to the twigs beside her, where it continued to browse. It always remained in contact with its dam and, after a few minutes, climbed back upon her once more. It clung to her ventral surface, back upward in the usual fashion, when she moved slowly away. From this it appeared that the young two-toed sloth does not leave its mother all at once, but only by degrees becomes independent of her.

In June a boy brought me a young two-toed sloth only ten inches in length, which had probably lost its mother, for it seemed too young to have otherwise begun to shift for itself. When placed in a tree, the little sloth climbed restlessly about over the branches, without attempting to eat the foliage. It seemed unable to climb up or down even a slender trunk. From time to time it voiced a low, bleating cry, perhaps a call for its lost mother. This cry, which was clearly audible at a distance of a hundred feet, is the only sound, other than hisses and sighs, that I have ever heard from a sloth of either species. The young two-toed sloth was possessed of much more spirit than the adult male three-toed sloth that I had earlier owned. If touched, it tried to defend itself by striking with its forefeet, but its blows were delivered too slowly to be effective. At the same time it protested by uttering a low hiss. When taken in hand it tried to bite, and, although its teeth were still very small, they commanded respect. Once, while being carried, it seized the palm of my hand between its jaws. The dullness of its teeth, coupled with the toughness of my skin, prevented its drawing blood; but the grip was painful while it lasted, and left the deep impressions of two teeth. If I tried to pull the young sloth from the branch to which it clung, it held on tenaciously and voiced fairly loud, bleating cries. After making observations and taking photographs, I sent the youngster back to the woodland, with the hope that it would live to grow up.

ALEXANDER GARDEN

(Continued from page 526)

he had seen male sperm.

Shortly after this discovery, Garden became a possessor of another interesting amphibian. This was the Congo Eel, *Amphiuma.* Garden writes thus in his letter to Linnaeus: "It differs in many particulars from the *Siren;* most evidently in the following. . . . This animal has four feet, with two toes to each, without claws. The *Siren* has only two feet. It wants the Gills and their wing-like coverings. It has no scales, nor, which seems to me very singular, any tongue! All of which are found in the *Siren.* I have opened the throat and satisfied myself respecting the presence or absence of gills." *Amphiuma* does have lungs, gills, and gill clefts; and, in his description, Garden does mention that there is a spiracle; however, the gills are not external.

Another very interesting rediscovery by Garden was that of the electric eel. Except for a brief note by Richer in the Memoires of the French Academy written towards the latter half of the seventeenth century, Garden was the first man to call to Europe's attention the remarkable qualities of this animal. This eel is found in British Guiana; and Garden first heard of it when a specimen arrived in Charleston aboard a ship recently come from that area. In a letter to Ellis, read before the Royal Society of London on February twenty-third, 1775, Garden gave the following interesting account of this animal: "The shock which our Surinam fish gives seems to be wholly electrical; all the phaenomena or properties of it exactly represent those of the Electrical aura of our atmosphere when collected as far as they are discoverable from the several trials made on this fish." No doubt the interest in electricity that Benjamin Franklin had aroused in Garden at the time of their meeting so many years before in Philadelphia was reawakened at the sight of the curious animal.

The greatest contributions made by Garden were, of course, in the field of botany. He collected plants in great numbers, sending them to both Linnaeus and Ellis. So many were new that it is impossible to list all of them. Among these were included the handsome silver-bell tree, *Halesia carolina;* the loblolly bay, *Gordonia lasianthus;* the buckthorn, *Bumelia tenax;* the Indian pink root, *Spigelia marilandica.* Garden noted the anthelmintic properties of this latter plant and worked out the proper dosages.

In his letters to Linnaeus and Ellis, Garden described many of the plants, suggesting generic names in honor of his friends. With these descriptions, he also included notes on the habits and ecology of the local fauna.

In return for all of Garden's efforts, Linnaeus honored him by having Garden elected a member of the Royal Society of Upsala, and in 1773 Garden was elected a fellow of the Royal Society of London.

Although Garden was most sincere in his regard of Linnaeus, he did differ with him on several points. On many of these questions Garden was correct. Garden was certain that Zamia, the cycad, was not a member of the fern tribe as Linnaeus believed. He was also correct in arguing that the palmetto was not a yucca.

From his letters we are unable to get much information as to the role played by

Garden in the political upheavals of his day. We do know that he was a Loyalist, and that the American Revolution came as a bitter blow to him. His only son, also named Alexander Garden, took the side of the colonists, much to the disappointment of the father. Garden's property was confiscated at the cessation of hostilities; however, due to the influence of his son, a small percentage was returned. But by this time Garden had returned to England with his wife and daughters. Contrary to the report of some authors, Garden did not amass a fortune; so no doubt he had to live in modest circumstances after his return to England. In the remaining eight years of his life, he received some of the honors that had been denied to him during the years of his residence in America. He enjoyed the companionship of the numerous friends with whom he had corresponded. Probably the event that flattered him most was his being elected to the vice-presidency of the Royal Society. In spite of the pleasant surroundings, his naturally poor health forced him to give up most of his scientific activities, and in 1791 he died of tuberculosis.

It is actually difficult to assess the value of the contributions of a man such as Garden. He was, in fact, not a great scientist or a great explorer. His accomplishments as a doctor were not world-shaking. Nevertheless his persistence over a number of years made possible the early understanding of the natural history of Carolina. In short, he was a good man and a worthy scientist.

Choosing Binoculars

Frequently we receive requests for advice on the selection of binoculars for Nature field work, and are always happy to make suggestions. It is not possible, however, to go into optical principles and details in a letter. There has, however, recently come to hand a little booklet entitled "How to Select Binoculars." It presents the basic information simply and effectively. Copies are available for twenty-five cents from Sard Binoculars, Kollsman Instrument Division, Elmhurst, New York.

Palisades Nature Group

Launched jointly by the Englewood Garden Club and the Ridgewood Audubon Society, the Palisades Nature Association already has a large and growing membership throughout New Jersey and is moving rapidly towards its objectives. Among its aims are the preservation and development of the area along the top of the Palisades, the restoration of a wildlife preserve to be known as Greenbrook Sanctuary, and the encouragement of a broad conservation and Nature program in this region. Mrs. LeRoy Clark is president, and the office of the secretary, Mrs. James I. Coddington, is 195 Knickerbocker Road, Tenafly, New Jersey.

Wisconsin Wildflowers

"Saving Wisconsin Wild Flowers" is the title of an attractive and informative booklet by Albert M. Fuller, Curator of Botany at the Milwaukee Public Museum, and published by that Museum as the first in a series of popular science handbooks. This 48-page bulletin is profusely and attractively illustrated, and should be extremely helpful on any campaign to protect wild flowers. The booklet sells for one dollar.

Gulls and Terns

Life Histories of North American Gulls and Terns. By Arthur Cleveland Bent. New York. 1947. Dodd, Mead and Company. 333 pages. $5.00.

All who know birds know, of course, the monumental work that Arthur Cleveland Bent has been doing in the fifteen volumes of life histories thus far published by the Smithsonian Institution. No few have wished that they could have the complete set, but the earlier volumes are now collectors' items, having been brought out in small editions. Dodd, Mead, however, is doing ornithology a great service in bringing out these important books in trade editions with the text exactly as originally presented, but with cloth instead of the original paper binding. This immediate volume is the second in the series, and, of course, should be in every properly supplied ornithological library.

Dog Stories

A Treasury of Dog Stories. Collected by Frances Cavanah and Ruth Cromer Weir. Chicago. 1947. Rand McNally and Company. 256 pages. Illustrations by Wesley Dennis. $2.50.

This attractive book is published for its appeal to youthful dog lovers in the eight- to eighty-year group, for adults will enjoy the stories fully as much as the younger audience the publishers seek. The collectors of this canine anthology have made an excellent choice of stories, choosing some by widely-known writers about dogs, and others by obscure but sincere dog-loving scribes. We would say that any boy or girl who has and loves a dog will delight in this book.

Louis Agassiz

Louis Agassiz, Scientist and Teacher. By James David Teller. Columbus, Ohio. 1947. The Ohio State University Press. 145 pages.

This is the second publication in the education series of Graduate School Studies published at Ohio State University. The author has done a splendid piece of work in both the biographical reconstruction of Agassiz's life and in evaluation of his contribution to and influence upon American scientific education.

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Under the Microscope

By JULIAN D. CORRINGTON

Dark-field illumination. Illustration courtesy of Bausch and Lomb.

RHEINBERG ILLUMINATION

MICROSCOPISTS have always been fond of experimenting with their instruments, illuminants, and specimens. Both amateurs and professionals have tried out all sorts of methods and gadgets, and, of course, this simian spirit has sired many of the improvements in microscope stands, accessories, lamps, and a great deal of the technique used today in preparing materials for observation. Mostly there has been design behind this sort of inventive work, and mostly the results have been improvements of a more or less important nature. The compound microscope itself is said to have been invented by Jansen by chance when he was monkeying with two lenses, one in each end of a telescoping tube, searching for an optical setup that we call today a telescope. Sometimes the gadgetering has proved disappointing, and the results discarded in favor of something better.

Occasionally, however, the toying with new ideas has been pure monkey business, a scientific boondoggling in the nature of a stunt, and it is about one of this class of accessories that we propose to tell you this month. Rheinberg discs are an interesting addition to the microscopist's bag of tricks. That they add nothing to the sum total of useful knowledge of microscopical architecture is attested by the fact that only one catalog out of seven of leading optical manufacturers even lists them at all. Nevertheless, the principle behind these discs is an important one, that of dark-field miscroscopy.

In ordinary, or bright-field microscopy, the area of view is strongly illuminated, the object, however transparent, appearing darker or denser than the surrounding field. In dark-field work, all direct light is intercepted, the object is illuminated by oblique rays of light (see illustration), which pass through it and continue on beyond and outside the objective, not entering the tube of the microscope, and not seen by the eye applied at the ocular. The field appears perfectly black. The object will, however, intercept many of these eblique rays and reflect some of them up the tube to the eye. Then the object appears to be glowing, as if self-luminous: an incandescent amœba, for example, against a black background. Dark-field microscopy has added a great deal of knowledge to the total that concerns microscopic structure; numerous items that cannot be seen under ordinary illumination are revealed by this unique form of inspection.

Rheinberg illumination is a modification of this same principle. Instead of cutting off direct light entirely, a colored filter disc is used so that the field appears of any desired hue. If to a small center disc of, for example, red cellophane, a second light filter of a strongly contrasting color, as blue, is added as a surrounding ring, the observer sees a blue object in a red field. Rays of light passing through the outer ring are like the oblique rays in dark-field; they do not go directly up the tube, but some of them are reflected by the object, which then appears to be of the same color as this outer ring.

The only sort of object that can be used to advantage with Rheinberg illumination is one that is colorless, or nearly so, and of a high degree of transparency, so that but little contrast obtains between the object and its surroundings in bright-field observations. An amœba is a good example; one must cut down the light and focus sharply in order to see this famous animal. Nothing new is brought out by studying an amœba with Rheinberg discs, but a blue amœba against a red background obviously presents far better contrast than a colorless amœba against a colorless background. The effect is a pretty and pleasing one, and the image makes a handsome Kodachrome slide for those who go in for color photomicrography. On the other hand, prolonged studies by colored lights are trying on the eyes.

Other suitable subjects include additional protozoa, as paramecium, or algae and other microorganisms, notably rotifers, unstrained paper and textile fibers or fabrics, fresh sections of plant stem or root, and ground bone or tooth.

The discs may be made of colored circles of gelatin or cellulose acetate, stamped or cut out of small sheets, the outer ring glued to the central piece or fastened by narrow strips after the principle of a stencil. Any colors may be employed so long as the two give good contrast; red center, blue margin; blue center, red margin; orange and green, and others. Transparency of the material selected must be high, to pass a large amount of light, and use is commonly limited to low power, although with a strong light source the high-dry objective is possible. Size of the two parts of the disc depends on whether or not a condenser is employed, and on the aperture of the objective. We suggest, for your instrument, you try first a central red disc of 5 mm. diameter, surrounded by a blue disc of such size as to give a total diameter of 2 cm. If the fit is just right, you may be able to seal the two together, the red inside the blue, with a hot iron. Mount this disc, if preferred for convenience of handling and storing, in a frame of black passepartout paper, cut to fit the slot beneath the condenser or stage aperture of your microscope. At present we do not know of any commercial sources for these discs in the United States.

TRADE NOTES

Geography The principle behind the writing of *Geography for Grown-Ups* strikes us as an excellent and sensible idea. The teaching of geography in our schools stops when we are very young, yet depends for its understanding on advanced and allied subjects not comprehensible by the young. So H. A. Calahan, well known writer on navigation, has proceeded to remedy the situation with a delightful and highly interesting book, packed with useful information and a tremendous assortment of facts and stories. The fifty-two chapters deal with astronomy, geology, geometry, maps, weather, climate, time, the various physiographic features of the earth, the separate continents and oceans, navigation by water and by air, and with human and strategic geography. Most interesting to us were the author's expositions of time and navigation, his succinct appraisals of the continents, and especially of peoples and their migrations, the best chapters dealing with deserts, grass, and husbandry.

It is most unfortunate that this really fine and interesting book was not submitted by the publishers to a scientific editorial board. Had this been done the book would not have been marred by serious technical errors. Mr. Calahan is evi-

dently an expert on navigation; he knows his astronomy, time, reckonings, and has an excellent grasp of world geography, but when he invades the fields of physics, geology, and biology, he is over his head and the results are sometimes ludicrous. For example (p. 12) "The speed of a radio wave is the same as the speed of light, and now we utilize in radar a speed so much faster than radio waves that it can measure the passage of a radio wave over distances as small as seventy-five feet." This is enough to make a high school student of physics sit up and bay at the moon: the author is evidently trying to tell us of differences in *wavelengths*, an entirely different matter. The statement (p. 114) that "all of geology is guesswork" is absurd, and his Chapter 17, "A Venture into Geology," is a most regrettable venture the author should never have made; geology is certainly *terra incognita* to him. The few biological references are likewise poorly done; paleontologists, who love their trilobites as you love your favorite dog, will writhe at "One of the most common animals of this age (Paleozoic) is called a trilobite, a horrible crawling thing that resembles the louse" (p. 104). There are unnecessary small errors, as the "earth's magnitude" (p. 98) when the author means magnetism, and (p. 284) the declaration that New Zealand lies southwest of Australia. There are double negatives and startling *non sequiturs* that make one wonder at the intended meanings.

However, the fact that we caught such errors proves that we read the whole book when we only intended a sampling of chapters for a review, and while we have been severe on Mr. Calahan's transgressing into territories he should have avoided, the fact remains that we enjoyed it and got a great deal out of it, one of the best tributes a reviewer can make. We now know more than we did formerly of latitude and longitude and how they are determined and used in navigation, great circles and their increasing importance, probabilities as to World War III and the role geography is destined to play in that conflict, and many other matters. It is a highly entertaining work, to be read in front of the living room fire, with an atlas or globe for map references. Text figures are by the author and the twenty-eight pen-and-ink plates by Stephen J. Voorhies are well done. Pp. x, 351. Harper & Brothers, 637 Madison Ave., New York 22, 1946. $3.50.

Mankind There are many sorts of students of the human species. Some specialize on one aspect, some on another; only rarely do we find a research expert with so broad a viewpoint as to encompass all phases of the multifaceted subject,—one who can look at the world as a whole, through the march of time, and give us a panorama of the paths we have traveled, the ways we are now pursuing, and the whys and wherefores thereof. Outstanding among such interpreters of mankind is Yale's noted geographer, Dr. Ellsworth Huntington; and outstanding among important books of this character is his *Mainsprings of Civilization*, a summation of over twenty years of work in this field, compiling his findings in many former papers and books, and advancing many new ideas.

There is a tremendous amount of vastly significant information in this volume; a really adequate review would consume many pages. Heredity and environment in the shaping of civilization are key topics to the two main sections, but here is no hackneyed discussion of these overworked subjects. Dr. Huntington develops the idea of kiths as more important than races, and traces such clinical cases as the Puritans of New England showing superior heredity to that of other groups of early American immigrants. Nations may rise to success at certain times and places, but not at others. The influence of weather and climate upon human affairs is a theme for which the author is well known; also the occurrence of many kinds of cyclic phenomena in nature and in human affairs. For example, the strange agreement in a 9-2/3 years cycle in maximum and minimum concentration of ozone in the atmosphere with population peaks in such diverse creatures as lynxes, salmon, and caterpillars, and with human deaths from heart ailments. Evidences are studied critically that electromagnetic radiation cycles influence the rise and fall of nations, migrations and births, the stock market, and numerous other apparently unrelated activities.

Parts of *Mainsprings* make fascinating reading. Other parts are necessarily dull or tedious, since the theses advanced require the use of many graphs, tables, and other statistical matter. These sections are essential as references. But the broad concepts set forth and the numberless ramifications from them make this book an important contribution to an understanding of mankind. World history that weds physics with economics, and meteorology with sociology, is a new and exciting presentation of our times. Pp. xii, 660; figs. 83, tables 26, bibliography. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, 1945. $4.75.

The Sea Most of us would like to know more about the oceans of the world, their geography, chemistry, physics, and biology. An excellent opportunity to gratify such a desire has been made available by Dr. Robert E. Coker, of the University of North Carolina, in *This Great and Wide Sea*, a modern oceanography that is brief but com-

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prehensive, and sufficiently nontechnical for the lay reader, yet suitable as a text of the subject for the classroom.

Part I, history and geography, treats of oceanography as a science and describes the classic work in this field, centered around chief personalities and methods. Part II, chemistry and physics, deals with salts and gases in solution, with temperature, viscosity, density, and pressure, with deposits, and with currents, winds, waves, and tides. Part III, life in the sea, describes the oceans as the environment for all types of plants and animals there occurring, taking up modes of life and habitats and the complex interrelations of living beings at all depths and over the world.

The reader gains a great respect for the sea as a mighty force in our lives, from whatever standpoint,—geographic, climatic, economic, or esthetic,—and Dr. Coker is a recognized authority who can tell us about these matters in both interesting and instructive accounts. Whether following whales in their mysterious comings and goings, their feeding and breeding, or obtaining a notion of the vast multitudes of copepods in the plankton, on which so many larger creatures browse, or tracing the course and influences of so great an ocean river as the Gulf Stream, the stories told are equally compelling. We disliked the constant repetition of numerous statements throughout the book, often wearisome, and think these should be radically pruned; likewise there are too many typographical errors, reflecting on the proofreading, for a high class book, beautifully printed and with many fine illustrations. Pp. xvii, 325; plts. 91, figs. 23. Univ. N. C. Press, Chapel Hill, 1947. $5.00.

Parasitology Readers interested in Helminthology, that division of Parasitology that deals with parasitic worms, are advised to read *This Wormy World*, presidential address before the annual meeting of the American Society of Parasitologists, at Boston, during the December, 1946, meetings, and published, with appended data, in *The Journal of Parasitology* for February, 1947, Vol. 33, No. 1, pp. 1-18. The author is Dr. Norman R. Stoll, of the Rockefeller Institute for Medical Research at Princeton, and he gives an illuminating as well as alarming census of worm parasites, by principal species, for the world and its chief political subdivisions. Dr. Stoll writes with a nice balance between information and humor, recounting many wartime experiences with large numbers of American troops in tropical situations, and concludes with suggestions to remedy the condition of more worm infestations than there are people, a 1+ incidence of infection for the entire world, in which Americans are far from being lily-white or immune.

Songs for the Laboratory

RECONVERSION

This is the ulna, Private Jones,
You've got it mixed with other bones,
You won citations in E. T. O.,
But you won't win them here in your Zoo.
This is the kidney, Major Green,
You have it labeled as the spleen,
Up in your Fortress you flew with verve,
But you can't tell a vein from a nerve.
We're proud of the foxholes you've made,
But we use a scalpel instead of a spade.
This is the thorax, Sergeant Brown,
You've drawn the organs upside down,
Your rows of salad we viewed with awe,
But we think you had best study law.

Bacteriology An entirely new work is the *General Bacteriology Laboratory Manual*, by Professor Leland S. McClung, Indiana University. We can heartily endorse the author's plan for this manual and the way he executes it. Instead of a number of lessons based on two- or three-hour laboratory periods, there are 61 exercises, of varying length, each complete in itself, and each capable of introduction into any portion of the course, as best fits a given text or lecture syllabus. All 61 can be covered in a one-semester course.

Dr. McClung encourages the student to master techniques and general principles, and to get more out of the exercises than mere mechanical results. Morphology, taxonomy, and physiology; preparation of media, culturing, and staining; these and other topics are well represented, and there are four appendices on the microscope, formulas, and methods. The manual is a workbook, in which the student makes notes and drawings, fills in tables, and otherwise keeps an accurate record of his progress in the laboratory. Pp. ix, 106. W. B. Saunders Co., West Washington Square, Philadelphia 5, 1946. $1.25.

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(*Gen.* indicates a general article; *fig.*, a photograph or drawing; *rev.*, a review; *port.*, a portrait.)

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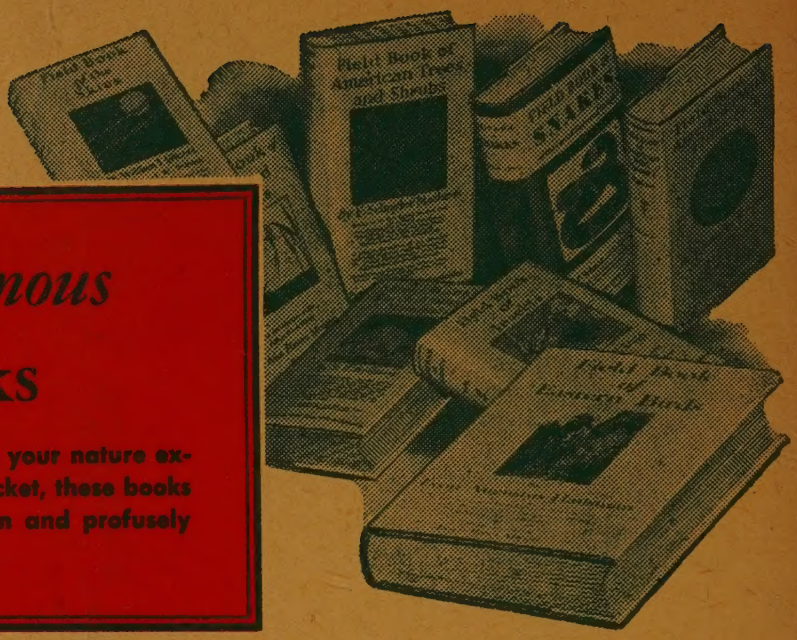

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